



Service Manual

Service Manual

KE990/KE990c



Model : KE990/KE990c



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1. INTRODUCTION

1.1 Purpose

This manual provides the information necessary to repair, calibration, description and download the features of this model.

1.2 Regulatory Information

A. Security

Toll fraud, the unauthorized use of telecommunications system by an unauthorized part (for example, persons other than your company's employees, agents, subcontractors, or person working on your company's behalf) can result in substantial additional charges for your telecommunications services. System users are responsible for the security of own system.

There are may be risks of toll fraud associated with your telecommunications system. System users are responsible for programming and configuring the equipment to prevent unauthorized use. The manufacturer does not warrant that this product is immune from the above case but will prevent unauthorized use of commoncarrier telecommunication service of facilities accessed through or connected to it. The manufacturer will not be responsible for any charges that result from such unauthorized use.

B. Incidence of Harm

If a telephone company determines that the equipment provided to customer is faulty and possibly causing harm or interruption in service to the telephone network, it should disconnect telephone service until repair can be done. A telephone company may temporarily disconnect service as long as repair is not done.

C. Changes in Service

A local telephone company may make changes in its communications facilities or procedure. If these changes could reasonably be expected to affect the use of the phones or compatibility with the network, the telephone company is required to give advanced written notice to the user, allowing the user to take appropriate steps to maintain telephone service.

D. Maintenance Limitations

Maintenance limitations on the phones must be performed only by the manufacturer or its authorized agent. The user may not make any changes and/or repairs except as specifically noted in this manual. Therefore, note that unauthorized alternations or repair may affect the regulatory status of the system and may void any remaining warranty.

1. INTRODUCTION

E. Notice of Radiated Emissions

This model complies with rules regarding radiation and radio frequency emission as defined by local regulatory agencies. In accordance with these agencies, you may be required to provide information such as the following to the end user.

F. Pictures

The pictures in this manual are for illustrative purposes only; your actual hardware may look slightly different.

G. Interference and Attenuation

A phone may interfere with sensitive laboratory equipment, medical equipment, etc. Interference from unsuppressed engines or electric motors may cause problems.

H. Electrostatic Sensitive Devices

ATTENTION

Boards, which contain Electrostatic Sensitive Device (ESD), are indicated by the  sign. Following information is ESD handling:

- Service personnel should ground themselves by using a wrist strap when exchange system boards.
- When repairs are made to a system board, they should spread the floor with anti-static mat which is also grounded.
- Use a suitable, grounded soldering iron.
- Keep sensitive parts in these protective packages until these are used.
- When returning system boards or parts like EEPROM to the factory, use the protective package as described.

2. PERFORMANCE

2.1 Supporting Standard

Item	Feature	Comment
Supporting Standard	GSM900/DCS1800/PCS1900 with seamless handover Phase 2+(include AMR) SIM Toolkit : Class 1, 2, 3, A-E	
Frequency Range	GSM900 TX : 880 - 915 MHz GSM900 RX : 925 - 960 MHz DCS1800 TX : 1710 - 1785 MHz DCS1800 RX : 1805 - 1880 MHz PCS1900 TX : 1850 - 1910 MHz PCS1900 RX : 1930 - 1990 MHz	
Application Standard	WAP 2.0, JAVA 2.0	

2.2 Main Parts : GSM Solution

Item	Part Name	Comment
Digital Baseband	Neptune (D761811BZVL): TI	
Analog Baseband	Triton (TWL3029): TI	
RF Chip	RTR6235 : Qualcomm	

2. PERFORMANCE

2.3 HW Features

Item		Feature	Comment
Form Factor		Slide	
Battery		1) Capacity Standard : Li-Ion, 800mAh	
		2) Packing Type : Soft Pack	
Size		Standard : 100.4 X 48.0 X 14.5 mm	
Weight		TBD	With Battery
Volume		70cc	
PCB		Staggered 8Layers , 0.8t	
Stand by time		250 hrs	@ Paging Period 9
Charging time		3 hrs	@ Power Off / 800mAh
Talk time		Min : 3.0 hrs @ Power Level 7	@ GSM850 / 800mAh
RX sensitivity		GSM900 : -105 dBm DCS 1800 : -105 dBm PCS 1900 : -105 dBm	
TX output power	GSM/ GPRS	GSM900 : 33 dBm DCS 1800 : 30 dBm PCS 1900 : 30 dBm	Class4 (GSM900) Class1 (PCS) Class1 (DCS)
	EDGE	GSM900 : 27 dBm DCS 1800 : 26 dBm PCS 1900 : 26 dBm	E2 (GSM900) E2 (PCS) E2 (DCS)
GPRS compatibility		GPRS Class 12	
EDGE compatibility		EDGE Class 12	
SIM card type		Plug-In SIM 3V /1.8V	
Display		Main LCD 262K Color TFT (320 x 240) Backlight : White LED	
Built-in Camera		2M CMOS Camera (VGA)	One button access
Status Indicator		None	

2. PERFORMANCE

Item	Feature	Comment
Keypad	Alphanumeric Key : 12 Function Key : 14 Side Key : 4 Total No of Keys :30	Function Key: 4 Key Navigation, OK, F1, F2, CLR, SND, MOD Side Key : Volume up/down, CAM, PWR/END
ANT	Main : Internal Fixed Type	
System connector	18 Pin	
Ear Phone Jack	18pin, 4 Pole, Stereo	
PC synchronization	Yes	
Memory	NAND Flash : 1Gbit SDRAM : 512Mbit	
Speech coding	FR, EFR, HR,AMR	
Data & Fax	Built in Data & Fax support	
Vibrator	Built in Vibrator	
Blue Tooth	V1.2, A2DP,	
MIDI(for Buzzer Function)	SW Decoded 40Poly	
Music Player	MP3/ WMA/AAC/HE-AAC/EAAC+	With Graphic EQ
Video Player	MPEG4, H.263, WMV9	
Camcorder	MPEG4, H.263,	
Voice Recording	Yes	
Speaker Phone mode Support	Yes	
Travel Adapter	Yes	
CDROM	Yes	
Stereo Headset	Yes	Optional
Data Cable	Yes	Optional
T-Flash (External Memory)	Yes	Optional

2. PERFORMANCE

2.4 HW SPEC.

Item	Description	Specification																																																																																																																								
1	Frequency Band	GSM • TX: 890 + 0.2 x n MHz • RX: 935 + 0.2 x n MHz (n = 1 ~ 124) EGSM • TX: 890 + 0.2 x (n-1024) MHz • RX: 935 + 0.2 x (n-1024) MHz (n = 975 ~ 1023) DCS1800 • TX: 1710.2 + 0.2 x (n-512) MHz • RX: 1805.2 + 0.2 x (n-512) MHz (n = 512 ~ 885) PCS1900 • TX: 1850 + (n-511) x 0.2 MHz • RX: 1930 + (n-511) x 0.2 MHz (n = 512 ~ 810)																																																																																																																								
2	Phase Error	RMS < 5 degrees Peak < 20 degrees																																																																																																																								
3	Frequency Error	< 0.1ppm																																																																																																																								
4	Power Level	<table><tr><th colspan="6">GSM, EGSM</th></tr><tr><th>Level</th><th>Power</th><th>Toler.</th><th>Level</th><th>Power</th><th>Toler.</th></tr><tr><td>5</td><td>33 dBm</td><td>±2dB</td><td>13</td><td>17 dBm</td><td>±3dB</td></tr><tr><td>6</td><td>31 dBm</td><td>±3dB</td><td>14</td><td>15 dBm</td><td>±3dB</td></tr><tr><td>7</td><td>29 dBm</td><td>±3dB</td><td>15</td><td>13 dBm</td><td>±3dB</td></tr><tr><td>8</td><td>27 dBm</td><td>±3dB</td><td>16</td><td>11 dBm</td><td>±5dB</td></tr><tr><td>9</td><td>25 dBm</td><td>±3dB</td><td>17</td><td>9 dBm</td><td>±5dB</td></tr><tr><td>10</td><td>23 dBm</td><td>±3dB</td><td>18</td><td>7 dBm</td><td>±5dB</td></tr><tr><td>11</td><td>21 dBm</td><td>±3dB</td><td>19</td><td>5 dBm</td><td>±5dB</td></tr><tr><td>12</td><td>19 dBm</td><td>±3dB</td><td></td><td></td><td></td></tr><tr><th colspan="6">DCS / PCS</th></tr><tr><th>Level</th><th>Power</th><th>Toler.</th><th>Level</th><th>Power</th><th>Toler.</th></tr><tr><td>0</td><td>30 dBm</td><td>±2dB</td><td>8</td><td>14 dBm</td><td>±3dB</td></tr><tr><td>1</td><td>28 dBm</td><td>±3dB</td><td>9</td><td>12 dBm</td><td>±4dB</td></tr><tr><td>2</td><td>26 dBm</td><td>±3dB</td><td>10</td><td>10 dBm</td><td>±4dB</td></tr><tr><td>3</td><td>24 dBm</td><td>±3dB</td><td>11</td><td>8 dBm</td><td>±4dB</td></tr><tr><td>4</td><td>22 dBm</td><td>±3dB</td><td>12</td><td>6 dBm</td><td>±4dB</td></tr><tr><td>5</td><td>20 dBm</td><td>±3dB</td><td>13</td><td>4 dBm</td><td>±4dB</td></tr><tr><td>6</td><td>18 dBm</td><td>±3dB</td><td>14</td><td>2 dBm</td><td>±5dB</td></tr><tr><td>7</td><td>16 dBm</td><td>±3dB</td><td>15</td><td>0 dBm</td><td>±5dB</td></tr></table>	GSM, EGSM						Level	Power	Toler.	Level	Power	Toler.	5	33 dBm	±2dB	13	17 dBm	±3dB	6	31 dBm	±3dB	14	15 dBm	±3dB	7	29 dBm	±3dB	15	13 dBm	±3dB	8	27 dBm	±3dB	16	11 dBm	±5dB	9	25 dBm	±3dB	17	9 dBm	±5dB	10	23 dBm	±3dB	18	7 dBm	±5dB	11	21 dBm	±3dB	19	5 dBm	±5dB	12	19 dBm	±3dB				DCS / PCS						Level	Power	Toler.	Level	Power	Toler.	0	30 dBm	±2dB	8	14 dBm	±3dB	1	28 dBm	±3dB	9	12 dBm	±4dB	2	26 dBm	±3dB	10	10 dBm	±4dB	3	24 dBm	±3dB	11	8 dBm	±4dB	4	22 dBm	±3dB	12	6 dBm	±4dB	5	20 dBm	±3dB	13	4 dBm	±4dB	6	18 dBm	±3dB	14	2 dBm	±5dB	7	16 dBm	±3dB	15	0 dBm	±5dB
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2. PERFORMANCE

Item	Description	Specification	
5	Output RF Spectrum (due to modulation)	GSM, EGSM	
		Offset from Carrier (kHz).	Max. dBc
		100	+0.5
		200	-30
		250	-33
		400	-60
		600 ~ 1,200	-60
		1,200 ~ 1,800	-60
		1,800 ~ 3,000	-63
		3,000 ~ 6,000	-65
		6,000	-71
		DCS / PCS	
		Offset from Carrier (kHz).	Max. dBc
		100	+0.5
		200	-30
		250	-33
		400	-60
		600 ~ 1,200	-60
		1,200 ~ 1,800	-60
		1,800 ~ 3,000	-65
		3,000 ~ 6,000	-65
		6,000	-73
6	Output RF Spectrum (due to switching transient)	GSM, EGSM	
		Offset from Carrier (kHz)	Max. (dBm)
		400	-19
		600	-21
		1,200	-21
		1,800	-24

2. PERFORMANCE

Item	Description	Specification		
6	Output RF Spectrum (due to switching transient)	DCS / PCS		
		Offset from Carrier (kHz).		Max. (dBm)
		400		-22
		600		-24
		1,200		-24
		1,800		-27
7	Spurious Emissions	Conduction, Emission Status		
8	Bit Error Ratio	GSM, EGSM BER (Class II) < 2.439% @-102dBm		
		DCS / PCS BER (Class II) < 2.439% @-102dBm		
9	Rx Level Report accuracy	± 3 dB		
10	SLR	8 ± 3 dB		
11	Sending Response	Frequency (Hz)	Max.(dB)	Min.(dB)
		100	-12	-
		200	0	-
		300	0	-12
		1,000	0	-6
		2,000	4	-6
		3,000	4	-6
		3,400	4	-9
		4,000	0	-
12	RLR	2 ±3 dB		
13	Receiving Response	Frequency (Hz)	Max.(dB)	Min.(dB)
		100	-12	-
		200	0	-
		300	2	-7
		500	*	-5
		1,000	0	-5
		3,000	2	-5
		3,400	2	-10
		4,000	2	
		* Mean that Adopt a straight line in between 300 Hz and 1,000 Hz to be Max. level in the range.		

2. PERFORMANCE

Item	Description	Specification	
14	STMR	13±5 dB	
15	Stability Margin	> 6 dB	
16	Distortion	dB to ARL (dB)	Level Ratio (dB)
		-35	17.5
		-30	22.5
		-20	30.7
		-10	33.3
		0	33.7
		7	31.7
		10	25.5
17	Side Tone Distortion	Three stage distortion < 10%	
18	<Change> System frequency (13 MHz) tolerance	≤ 2.5ppm	
19	<Change>32.768KHz tolerance	≤ 30ppm	
20	Power consumption	Full power : < 340mA (GSM850) ; < 260mA (DCS / PCS) Standby : - Normal Mode ≤ 4.0mA(Max. power) - Using Test mode on DSP Sleep function ≤ 6mA	
21	Talk Time	GSM850/Level7 (Battery 800mA):210 Min GSM850/Level12(Battery 800mA):350 Min PCS1900/Level5 (Battery 800mA):310 Min PCS1900/Level10(Battery 800mA):390 Min	
22	Standby Time	Under conditions, at least 200 hours: Brand new and full 800mAh battery Full charge, no receive/send and keep GSM in idle mode. Broadcast set off. Signal strength display labove. Backlight of phone set off.	
23	Ringer Volume	At least 80 dB under below conditions: 1. Ringer set as ringer. 2. Test distance set as 50 cm	
24	Charge Voltage	Fast Charge : < 600 mA Slow Charge: < 60 mA	
25	Antenna Display	Antenna Bar Number	Power
		4	-90 dBm ~ -86 dBm
		3	-95 dBm ~ -91 dBm
		2	-100 dBm ~ -96 dBm
		1	-105 dBm ~ -101 dBm
		0	~ -105 dBm

2. PERFORMANCE

Item	Description	Specification	
26	Battery Indicator	Battery Bar Number	Voltage
		0(included Blinking)	3.65V ~ 3.35V
		1	3.71V ~ 3.66V
		2	3.78V ~ 3.72V
		3	3.91V ~ 3.79V
		4	4.20V ~ 3.92V
27	Low Voltage Warning	3.5 ± 0.03 V (Call) 3.6 ± 0.03 V (Standby)	
28	Forced shut down Voltage	3.35 ± 0.03 V	
29	Battery Type	1 Li-Ion Battery Standard Voltage = 3.7 V Battery full charge voltage = 4.2 V Capacity: Min 930mAh	
30	Travel Charger	Switching-mode charger Input: 100 ~ 240 V, 50/60Hz Out put: 5.1V, 700mA	

3.1 General Description

EGSM / DCS1800/
PCS1900

-
- The diagram illustrates the system architecture of a mobile phone, divided into four main functional blocks:
- Block 1 (Baseband Processor):** This block contains the core processing components. It includes a GSMEDGE PA, GSM1800 Tx BPF, GSM1800 Rx BPF, GSM1900 Rx BPF, and a GSM1800 Rx BPF. It also features a Power Detector, LO generation & Distribution, and PLL #1. The baseband processor is connected to the RF front-end and the phone VCTCXO.
 - Block 2 (RF Front-End):** This block handles the RF signals. It includes a GSMEDGE PA, GSM1800 Tx BPF, GSM1800 Rx BPF, GSM1900 Rx BPF, and a GSM1800 Rx BPF. It also features a Power Detector, LO generation & Distribution, and PLL #1. The RF front-end is connected to the baseband processor and the phone VCTCXO.
 - Block 3 (Phone VCTCXO):** This block contains the Phone VCTCXO (Variable Capacitor Tuning Circuit) and the PM6635-3P IC. The PM6635-3P IC includes Input Power Management, Voltage Regulators, General Housekeeping, User Interfaces, and IC Interfaces. The phone VCTCXO is connected to the RF front-end and the baseband processor.
 - Block 4 (FM Radio Module):** This block contains the FM Radio Module, which is connected to the baseband processor.
- The diagram also shows various other components and connections, including a GSMEDGE PA, GSM1800 Tx BPF, GSM1800 Rx BPF, GSM1900 Rx BPF, GSM1800 Rx BPF, a Power Detector, LO generation & Distribution, PLL #1, PLL #2, and various filters (BPF, LPF). The diagram is labeled with "ESM6270" on the right side.

A generic, high-level functional block diagram of KE990/KE990c is shown in Figure 3-1. One antenna collects base station forward link signals and radiates handset reverse link signals. The antenna connects with receive and transmit paths through a FEM(Front End Module).

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3. TECHNICAL BRIEF

In the GSM receive path, the received RF signals are applied through their bandpass filters and down-converted directly to baseband in the RTR6235 transceiver IC.

These baseband outputs are routed to the ESM IC for further signal processing.

The GSM/EDGE transmit path employs one stage of up-conversion and, in order to improve efficiency, is divided into phase and amplitude components to produce an open-loop Polar topology:

1. The on-chip quadrature up-converter translates the GMSK-modulated signal or 8- PSK modulated signal, to a constant envelope phase signal at RF;
2. The amplitude-modulated (AM) component is applied to the ramping control pin of Polar power amplifier from a DAC within the ESM

KE990/KE990c power supply voltages are managed and regulated by the PM6635 Power Management IC. This versatile device integrates all wireless handset power management, general housekeeping, and user interface support functions into a single mixed signal IC. It monitors and controls the external power source and coordinates battery recharging while maintaining the handset supply voltages using low dropout, programmable regulators.

The device's general housekeeping functions include an ADC and analog multiplexer circuit for monitoring on-chip voltage sources, charging status, and current flow, as well as user-defined off-chip variables such as temperature, RF output power, and battery ID. Various oscillator, clock, and counter circuits support IC and higher-level handset functions. Key parameters such as under-voltage lockout and crystal oscillator signal presence are monitored to protect against detrimental conditions.

3.2 GSM Mode

3.2.1 GSM Receiver

The Dual-mode KE990/KE990c's receiver functions are split between the three RFICs as follows:

- EGSM-900, DCS-1800 and PCS-1900 modes both use the RTR6235 IC only. Each mode has independent front-end circuits and down-converters, but they share common baseband circuits (with only one mode active at a time). All receiver control functions are beginning with SBI2-controlled parameters.

RF Front end consists of antenna, antenna switch module (LMSP43QA-538) which includes four RX saw filters (EGSM-900, DCS-1800 and PCS-1900). The antenna switch module allows multiple operating bands and modes to share the same antenna. In KE990/KE990c, a common antenna connects to one of six paths: 1) GSM 900 Tx (Low Band Tx's share the same path), 2) GSM1800/1900 Tx (High Band Tx's share the same path), 3) EGSM900 Rx, 4) GSM1800 Rx, 5) GSM1900 Rx. EGSM900, DCS1800, and PCS1900 operation is time division duplexed, so only the receiver or transmitter is active at any time and a frequency duplexer is not required.

Control Logic

Mode	Vdd	Vc1	Vc2
GSM850/900 Tx	2.4 ~ 2.8 V	0.7x(Vdd) ~ 2.8 V	0.7x(Vdd) ~ 2.8 V
GSM1800/1900 Tx	2.4 ~ 2.8 V	0 V	0.7x(Vdd) ~ 2.8 V
GSM850/900 Rx	2.4 ~ 2.8 V	0.7x(Vdd) ~ 2.8 V	0 V
GSM1800/1900 Rx	2.4 ~ 2.8 V	0 V	0 V

[Table 3.2.1] Antenna Switch Module Control logic

The EGSM900, DCS1800, and PCS1900 receiver inputs of RTR6235 are connected directly to the transceiver front-end circuits(filters and antenna switch module).

EGSM900, DCS1800, and PCS1900 receiver inputs use differential configurations to improve common-mode rejection and second-order non-linearity performance. The balance between the complementary signals is critical and must be maintained from the RF filter outputs all the way into the IC pins.

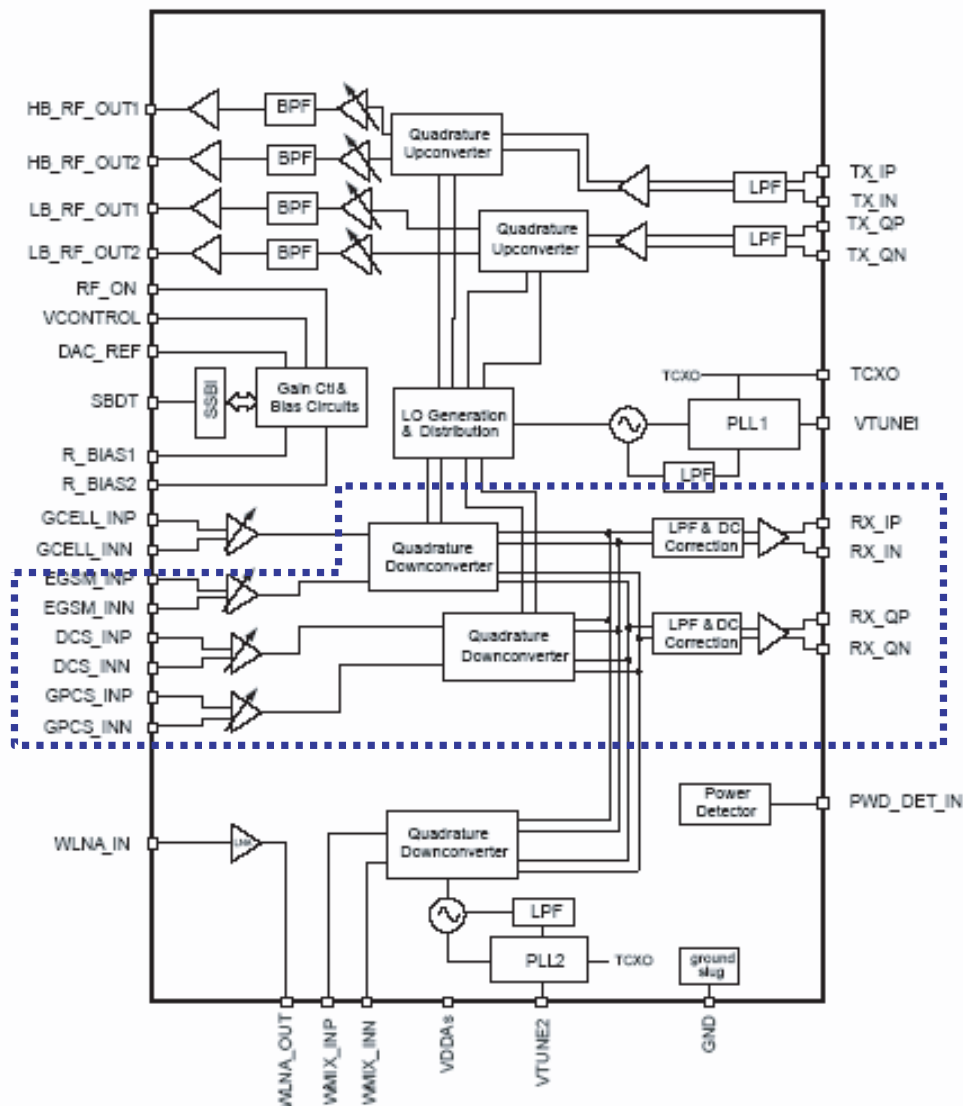
Since EGSM900, DCS1800, and PCS1900 signals are time-division duplex (the handset can only receive or transmit at one time), switches are used to separate Rx and Tx signals in place of frequency duplexers - this is accomplished in the switch module.

² The RFIC operating modes and circuit parameters are ESM-controlled through the proprietary 3-line Serial Bus Interface (SBI). The Application Programming Interface (API) is used to implement SBI commands. The API is documented in AMSS Software - please see applicable AMSS Software documentation for details.

3. TECHNICAL BRIEF

The EGSM900, DCS1800, and PCS1900 receive signals are routed to the RTR6235 through band selection filters and matching networks that transform single-ended 50-Ω sources to differential impedances optimized for gain and noise figure. The RTR input uses a differential configuration to improve second-order inter-modulation and common mode rejection performance. The RTR6235 input stages include ESMcontrolled gain adjustments that maximize receiver dynamic range.

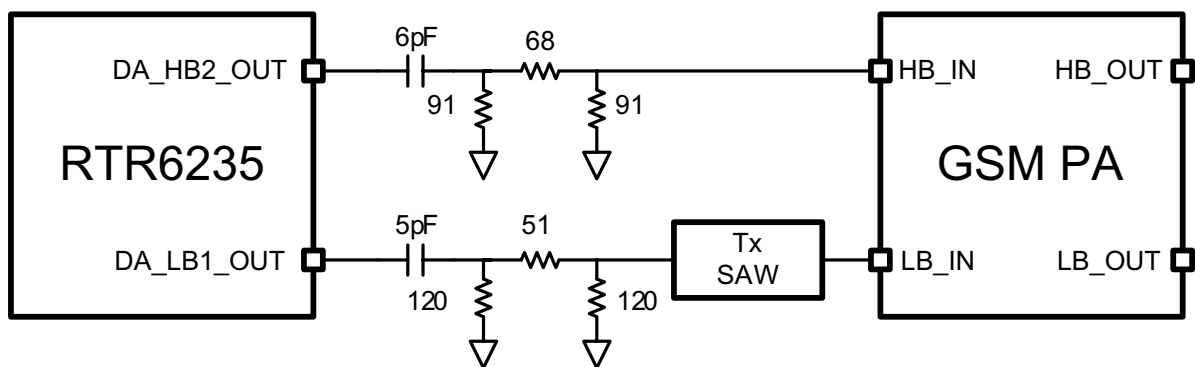
The amplifier outputs drive the RF ports of the quadrature RF-to-baseband downconverters. The downconverted baseband outputs are multiplexed and routed to lowpass filters (one I and one Q) having passband and stopband characteristics suitable for GMSK or 8-PSK processing. These filter circuits include DC offset corrections. The filter outputs are buffered and passed on to the ESM6270 IC for further processing



[Fig 3.2.2] RTR6235 RX feature

3.2.2 GSM Transmitter

The RTR6235 transmitter outputs (DA_HB2_OUT and DA_LB1_OUT) include on-chip output matching inductors. 50ohm output impedance is achieved by adding a series capacitor at the output pins. The capacitor value may be optimized for specific applications and PCB characteristics based on pass-band symmetry about the band center frequency, the suggested starting value is shown in Figure 3.2.3.



[Fig 1.3] GSM Transmitter matching

The RTR6235 IC is able to support GSM 850/900 and GSM 1800/1900 mode transmitting. This design guideline shows a Quad-band GSM application.

Both high-band and low band outputs are followed by resistive pads to ensure that the load Presented to the outputs remains close to 50ohm. The low-band GSM. Tx path also includes a Tx-band SAW filter to remove noise-spurious components and noise that would be amplified by the PA and appear in the GSM Rx band

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3.3 LO generation and distribution circuits

The integrated LO generation and distribution circuits are driven by internal VCOs to support various modes to yield highly flexible quadrature LO outputs that drive all GSM/EDGE band upconverters and downconverters; with the help of these LO generation and distribution circuits, true zero-IF architecture is employed in all GSM band receivers and transmitters to translate the signal directly from RF to baseband and from baseband to RF.

Two fully functional fractional-N synthesizers, including VCOs and loop filters, are integrated within the RTR6235 IC. The synthesizer (PLL1) creates the transceiver LOs that support four GSM band receivers and transmitters including: GSM850, EGSM900, DCS1800, and PCS1900. An external TCXO input signal is required to provide the synthesizer frequency reference to which the PLL is phase and frequency locked. The RTR6235 IC integrates most of PLL loop filter components on-chip except two off-chip loop filter series capacitors, and significantly reduces off-chip component requirement. With the integrated fractional-N PLL synthesizers, the RTR6235 has the advantages of more flexible loop bandwidth control, fast lock time, and low-integrated phase error

3.4 Off-chip RF Components

3.4.1 VCTCXO (X100 : TG-5010LH(19.2M))

The Voltage Controlled Temperature Compensated Crystal Oscillator (VCTCXO) provides the reference frequency for all RFIC synthesizers as well as clock generation functions within the ESM6270 IC. The oscillator frequency is controlled by the ESM6270 IC's TRK_LO_ADJ pulse density modulated signal in the same manner as the transmit gain control TX_AGC_ADJ. A two-pole RC lowpass filter is recommended on this control line.

The PM6635 IC controls the handset power-up sequence, including a special VCTCXO warm-up interval before other circuits are turned on. This warm-up interval (as well as other TCXO controller functions) is enabled by the ESM TCXO_EN line. The PM6635 IC VREG_TCXO regulated output voltage is used to power the VCTCXO and is enabled before most other regulated outputs.

Any GSM mode power control circuits within the ESM6270 IC require a reference voltage for proper operation and sufficient accuracy. Connecting the PM6635 IC REF_OUT directly to the ESM6270 IC GSM_PA_PWR_CTL_REF provides this reference. This sensitive analog signal needs a 0.1 μ F low frequency filter near to ESM side, and isolate from digital logic and clock traces with ground on both sides, plus ground above and below if routed on internal layers.

3.4.2 Front-End Module (FL100 : LMSP43QA-538)

This equipment uses a single antenna to support all handset operating modes, with an antenna switch module select the operating frequency and band. The active connection is ESM-selected by three control lines (GPIO[9] and GPIO[10]). These GPIOs are programmed to be ANT_SEL0 and ANT_SEL1 respectively.

Control Logic

Mode	Vdd	Vc1	Vc2
GSM850/900 Tx	2.4 ~ 2.8 V	0.7x(Vdd) ~ 2.8 V	0.7x(Vdd) ~ 2.8 V
GSM1800/1900 Tx	2.4 ~ 2.8 V	0 V	0.7x(Vdd) ~ 2.8 V
GSM850/900 Rx	2.4 ~ 2.8 V	0.7x(Vdd) ~ 2.8 V	0 V
GSM1800/1900 Rx	2.4 ~ 2.8 V	0 V	0 V

[Table 3.4.2] Front End Module control logic

3. TECHNICAL BRIEF

3.4.3 PMIC Functional Block Diagram (U501 : PM6635-3P)

■ Input power management

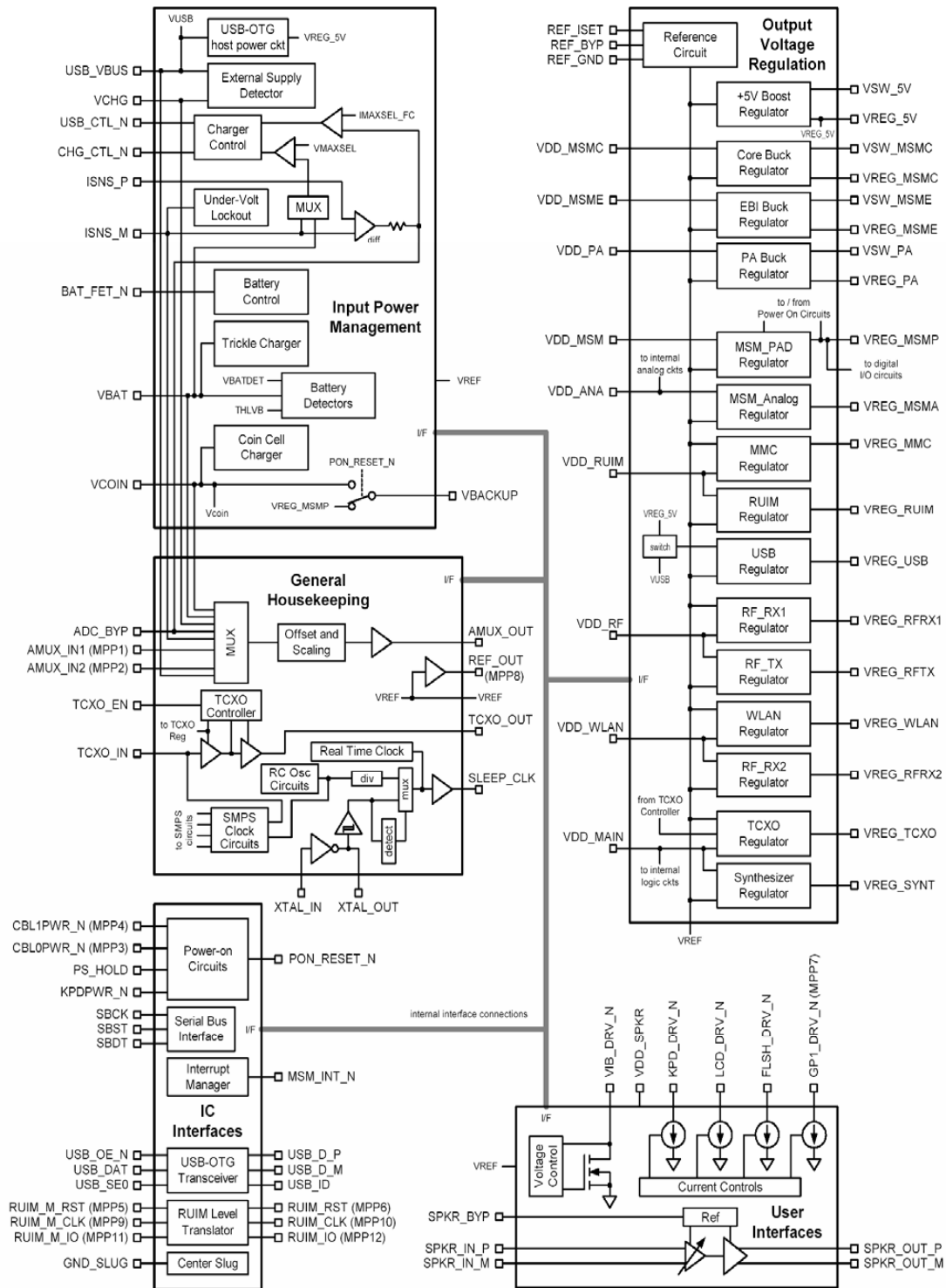
- Valid external supply attachment and removal detection
- Supports unregulated (closed-loop) external charger supplies and USB supplies as input power sources
- Supports lithium-ion main batteries
- Trickle, constant current, constant voltage, and pulsed charging of the main battery
- Supports coin cell backup battery (including charging)
- Battery voltage detectors with programmable thresholds
- VDD collapse protection
- Charger current regulation and real-time monitoring for over-current protection
- Charger transistor protection by power limit control
- Control drivers for two external pass transistors and one external battery MOSFET - MOSFET is optional
- Voltage, current, and power control loops
- Automated recovery from sudden momentary power loss

■ Output voltage regulation

- One boost (step-up) switched-mode power supply (SMPS) for driving white LEDs and hosting USBOTG
- Three buck (step-down) switched-mode power supplies that efficiently generate ESMC, ESME, and PA (or second ESMC) supply voltages
- Supports dynamic voltage scaling (DVS) for ESMC and PA
- Eleven low dropout regulator circuits with programmable output voltages, implemented using three different current ratings: 300 mA (two), 150 mA (six), and 50 mA (three). These can be used to power ESMA, ESMP, RFRX1, RFRX2, RFTX, SYNT, TCXO, WLAN, MMC, USB, and RUIM circuits.
- All regulators can be individually enabled/disabled for power savings
- Low power mode available on ESMA and ESMP regulators
- All regulated outputs are derived from a common bandgap reference - close tracking

- Integrated handset-level housekeeping functions reduces external parts count, size, cost
 - Analog multiplexer selects from 8 internal and up to 18 external inputs
 - Multiplexer output's offset and gain are adjusted, increasing the effective ADC resolution
 - Adjusted multiplexer output is buffered and routed to an ESM device ADC
 - Dual oscillators - 32.768 kHz off-chip crystal and on-chip RC assures ESM device sleep clock
 - Crystal oscillator detector and automated switch-over upon lost oscillation
 - Real time clock for tracking time and generating associated alarms
 - On-chip adjustments minimize crystal oscillator frequency errors
 - Circuits control TCXO warm-up and synchronize, deglitch, and buffer the TCXO signal
 - TCXO buffer control for optimal QPH/catnap timing
 - Three-stage over-temperature protection (smart thermal control)
- Integrated handset-level user interfaces
 - Four programmable current sinks recommended as keypad backlight, LCD backlight, camera flash, and general-purpose drivers
 - Vibration motor driver programmable from 1.2 to 3.1V in 100 mV increments
 - Speaker driver with programmable gain, turn-on time, and muting; differential operation (drives external 8 Ω speakers with volume controlled 500 mW)
- IC-level interfaces
 - ESM device-compatible 3-line SBI for efficient initialization, status, and control
 - Supports the ESM device's interrupt processing with an internal interrupt manager
 - Many functions monitored and reported through real-time and interrupt status signals
 - Dedicated circuits for controlled power-on sequencing, including the ESM device's reset signal
 - Several events continuously monitored for triggering power-on/power-off sequences
 - Supports and orchestrates soft resets
 - USB-OTG transceiver for full-speed (12 Mb/s) and low speed (1.5 Mb/s) interfacing of the ESM device to computers as a USB peripheral, or connecting the ESM device to other peripherals
 - RUIM level translators enable ESM device interfacing with external modules
- Twelve multi-purpose pins that can be configured as digital or analog I/Os, bidirectional I/Os, or current sinks. Default functions support the RUIM level translators, power-on circuits, analog multiplexer inputs, an LED driver, and a reference voltage buffer.
- Highly integrated functionality in a small package - 84-pin BCCS with a large center slug for electrical ground, mechanical stability, and thermal relief

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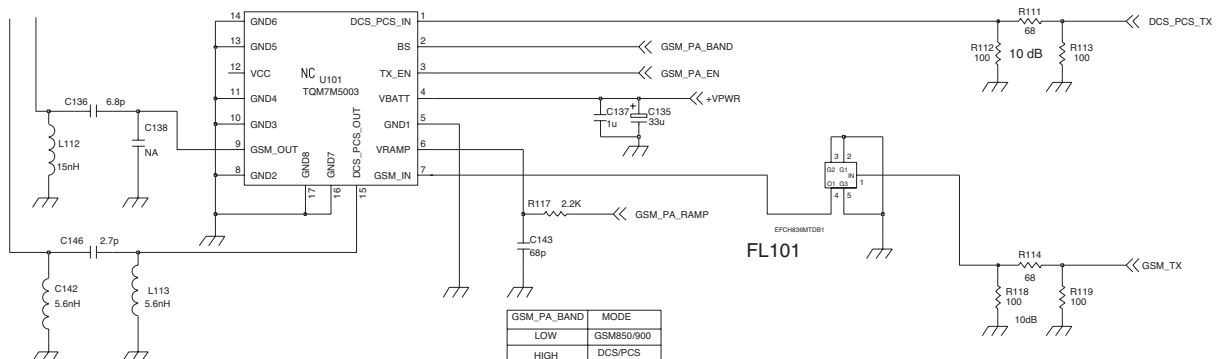


[Figure 3.4.3] PM6635 Block Diagram

3.4.4 GSM PAM (U101:TQM7M5003)

The TQM7M5003 is an extremely small (7 x 7 mm), GSM/EDGE PAM for handset applications. This module has been optimized for excellent EDGE efficiency and Pout in a Polar Loop environment at EDGE class E2+ operation while maintaining high GSM/GPRS efficiency.

The small size and high performance is achieved with high-reliability 3rd generation InGaP HBT technology. With 50Ω and output, no external matching or bias components are required. The module incorporates two highly-integrated InGaP power amplifier die with a CMOS controller. Each amplifier has three gain stages with on-die inter-stage matching implemented with a high Q passives technology for optimal performance. The CMOS controller implements a fully integrated power control within the module for GSM operations, and serves as the AM/AM path in EDGE operations. This eliminates the need for any external couplers, power detectors, current sensing etc., to assure the output power level. The module has Tx enable and band select inputs. Module construction is a low-profile overmolded landgrid array on laminate.



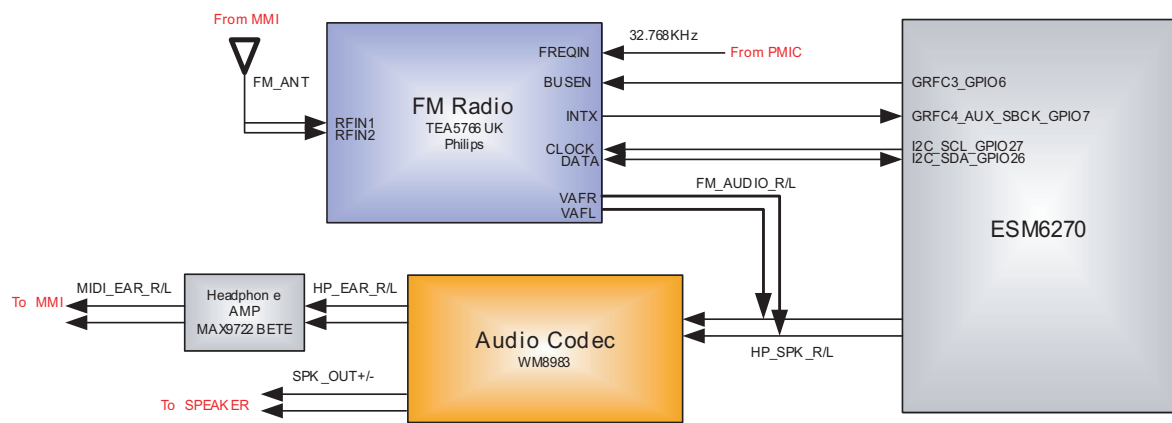
[Figure 3.4.4] GSM PAM Schematic

Figure3.4.5 shows the bluetooth system architecture in the KE990/KE990c.



3.4.6 FM Radio (U103 : TEA5766UK)

This FM Module is a single chip, electronically tuned, FM stereo radio with RDS/RBDS demodulator and decoder for low voltage applications, with fully integrated IF selectivity and demodulation. This equipment tunes the European, US, and Japanese FM bands. Figure 3.4.6 shows the FM Radio system architecture in the KE990.



[Figure 3.4.6]

3. TECHNICAL BRIEF

3.5 Digital Baseband (DBB/ESM6270)

3.5.1 General Description

A. Features (ESM6270)

- Support for multimode operation - GSM/GPRS/EDGE, and GPS
- High-performance ARM926EJ-S ϕ , running at up 270 MHz
- ARM Jazelle Java hardware acceleration for faster Java-based games and other applets
- QDSP4000 high-performance DSP cores
- Integrated gpsOne position location technology functionality
- Integrated Bluetooth 1.2 baseband processor for wireless connectivity to peripherals
- Qcamera ϕ , with 30 fps QVGA viewfinder resolution, and support for 4 MP camera sensors
- Direct interface to digital camera module with video front-end (VFE) image processing
- True 3D graphics for advanced wireless gaming
- SecureMSM v2.0 includes support for SIM-lock and IMEI integrity, and Qfuse
- Audio on par with portable music players
- Vocoder support (AMR, FR, EFR, HR)
- Advanced 14 x 14 mm, 0.5 mm pitch, 409-pin lead-free CSP technology
- SD/SDIO hardware support

3. TECHNICAL BRIEF

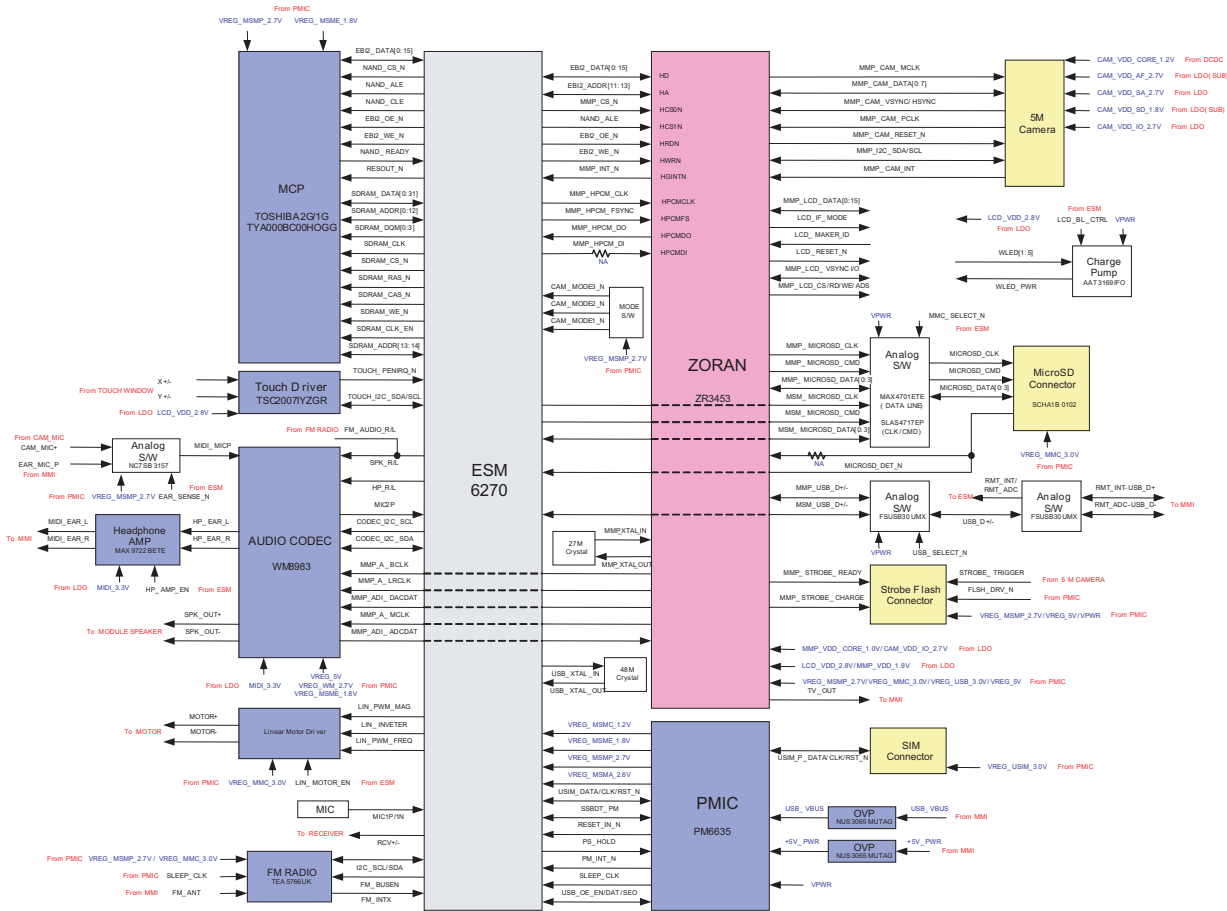


Figure. Simplified Block Diagram of Baseband

3. TECHNICAL BRIEF

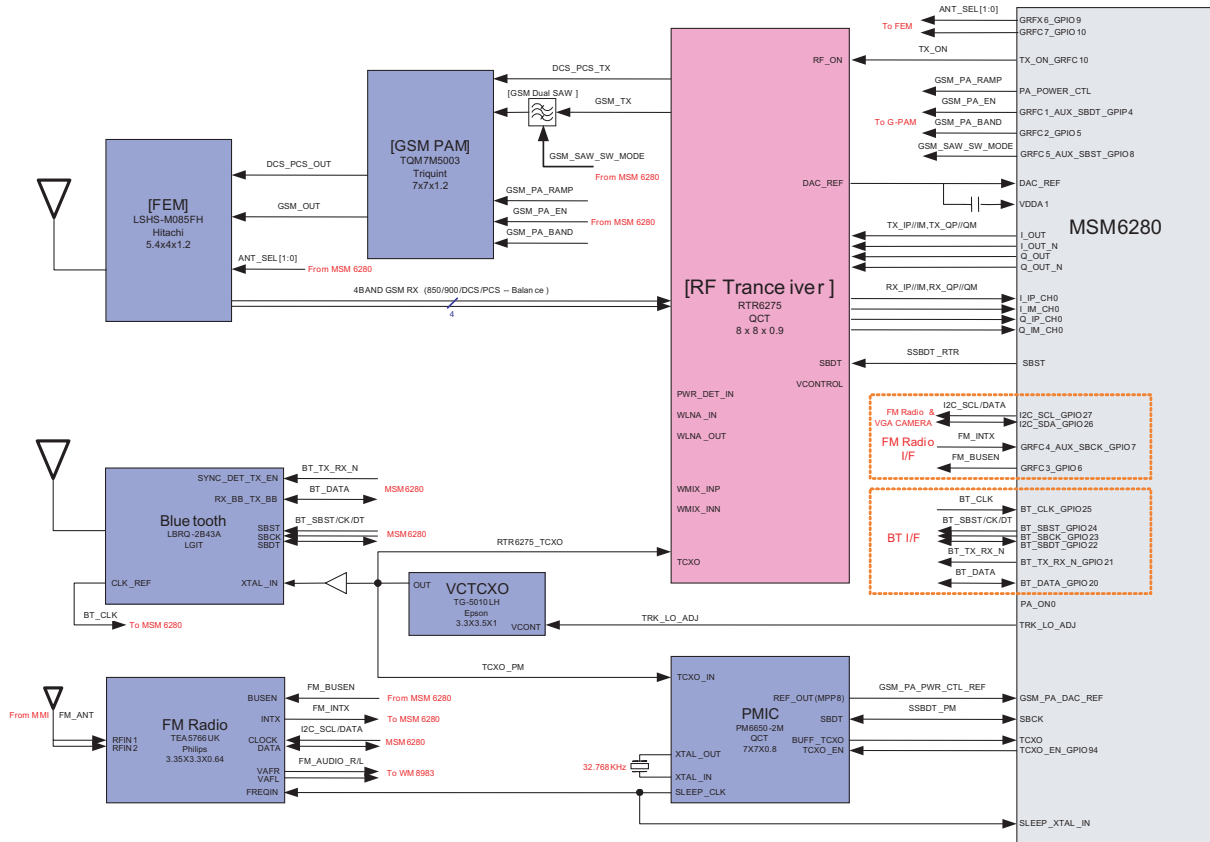


Figure. Simplified Block Diagram of RF

3.6 Subsystem(ESM6270)

3.6.1 ARM Microprocessor Subsystem

The ESM6270 device uses an embedded ARM926EJ-S microprocessor. This microprocessor, through the system software, controls most of the functionality for the ESM, including control of the external peripherals such as the keypad, LCD, SDRAM, and NAND-Flash devices. Through a QUALCOMM proprietary serial bus interface (SBI) the ARM926EJ-S configures and controls the functionality of the RTR6235, RFR6275 and PM6635 devices.

3.6.2 GSM features

The following GSM modes and data rates are supported by the ESM6270 device hardware. Support modes conform to release '99 specifications of the sub-feature.

■ Voice features

- ☐ FR
- ☐ EFR
- ☐ AMR
- ☐ HR
- ☐ A5/1, A5/2, and A5/3 ciphering

■ Circuit-switched data features

- ☐ 9.6k
- ☐ 14.4k
- ☐ Fax
- ☐ Transparent and non-transparent modes for CS data and fax
- ☐ No sub-rates are supported.

3.6.3 GPRS features

■ Packet switched data (GPRS)

- ☐ DTM (Simple Class A) operation
- ☐ Multi-slot class 12 data services
- ☐ CS schemes: CS1, CS2, CS3, and CS4
- ☐ GEA1, GEA2, and GEA3 ciphering

■ Maximum of four Rx timeslots per frame

3. TECHNICAL BRIEF

3.6.4 EDGE features

- EDGE E2 power class for 8 PSK
- DTM (simple Class A), multi-slot class 12
- Downlink coding schemes - CS 1-4, MCS 1-9
- Uplink coding schemes - CS 1-4, MCS 1-9
- BEP reporting
- SRB loopback and test mode B
- 8-bit, 11-bit RACH
- PBCCH support
- 1phase/2 phase access procedures
- Link adaptation and IR
- NACC, extended UL TBF.

3.6.5 ESM6270 device audio processing features

- Integrated wideband stereo CODEC
 - 16-bit DAC with typical 88 dB dynamic range
 - Supports sampling rates up to 48 kHz on the speaker path and 16 kHz on the microphone path
- VR- Voice mail + voice memo
- Acoustic echo cancellation
- Audio AGC
- Audio Codecs: AMR-NB, AAC, AAC Plus, Enhanced AAC Plus, Windows Audio v9, Real Audio 8 (G2)
- Internal vocoder supporting AMR, FR, EFR, and HR

3.6.6 ESM6270 microprocessor subsystem

- Industry standard ARM926EJ-S embedded microprocessor subsystem
 - 16 kB instruction and 16 kB data cache
 - Instruction set compatible with ARM7TDMI®
 - ARM version 5TEJ instructions
 - Higher performance 5 stage pipeline, Harvard cached architecture
 - Higher internal CPU clock rate with on-chip cache
- Java hardware acceleration
- Enhanced memory support

Please note that NOR/PSRAM will not be supported on ESM6270.

 - 75 MHz and 90 MHz bus clock for SDRAM
 - 32-bit SDRAM
 - Dual memory buses separating the high-speed memory subsystem (EBI1) from low-speed peripherals (EBI2) such as LCD panels
 - 1.8 V or 2.6 V memory interface support (excluding EBI1)

- ☐ NAND FLASH memory interface
 - 8/16-bit data I/O width NAND flash support
 - 1- or 4-bit ECC
 - 512-byte/2KB page-size support
 - 2 chip selects supported for NAND Flash
- ☐ Boot from NAND
- ☐ Low-power SDRAM (LP-SDRAM) interface
- Internal watchdog and sleep timers

3.6.7 Supported interface features

- USB On-the-Go core supports both slave and host functionality
- Three universal asynchronous receiver transmitter (UART) serial ports
- SIM controller (via UART)
- Integrated 4-bit secure digital (SD) controller for SD and Mini SD cards
- Parallel LCD interface
- General-purpose I/O pins
- External keypad interface

3.6.8 Supported multimedia features

- Provide additional general purpose MIPS by using:
 - ☐ Two QDSP4000s
 - ☐ Dedicated hardware accelerators and compression engines
- Improve Java, BREW, and game performance
 - ☐ Integrated Java and 2D/3D graphics accelerator with Sprite engine
- Enable various accessories via USB host connectivity.
 - ☐ Integrated USB host controller functionality
- Enable compelling visual and audio applications.

Qcamera™

- High-quality digital camera processing, supporting CCD or CMOS image sensors up to 4-megapixel with 15 fps capture rate
- 15 fps QVGA viewfinder

Qtv™

- Audio and video decoder that supports VOD, MOD and Broadcast multimedia services.
- Audio Codecs supported: AMR-NB, AAC, AAC Plus, Enhanced AAC Plus, Windows®
- Audio v9, RealAudio® v8
- Integrated stereo wideband Codec for music/digital clips
- CMX
- Video Codecs supported: MPEG-4, H.263, H.264, Windows Media® v9 and RealNetworks® v10

3. TECHNICAL BRIEF

Video telephony services: Qvideophone™

- A two-way mobile video conferencing solution that delivers 15 fps @ QCIF
- Video Codecs supported: MPEG-4 and H.263
- Audio Codecs supported: AMR-NB.

Qcamcorder™

- Real time mobile video encoder
- Video Codecs supported: MPEG-4, H.263.H.264
- Audio Codecs supported: AMR-NB, AAC
- Recording performance: 15 fps @ QVGA, 384 kbps

gpsOne™

- Integrated gpsOne processing
- Standalone gpsOne mode in which the handset acts as a GPS receiver

CMX™(MIDI and still image, animation, text, LED/vibrate support)

- 72 simultaneous polyphonic tones
- 44 kHz sampling rate
- 512 kB wave table
- Support of universal file formats
 - Standard MIDI Format (SMF)
 - SP-MIDI
 - SMAF Audio playback (MA-2, MA-3, MA-5)
 - XMF/OLS
 - MFi (requires Docomo license)
- PNG decoder
- Pitch bend range support
- LED/vibrate support
- Scalable Vector Graphics (SVG- Tiny 1.1 + SVG Tiny 1.2)
- MLZ decoder
- Integrated PNG/SAF A.T.

Features	ESM6270 device
Processor	ARM926 EJ-S – 225 MHz and 270 MHz (for 3.6 Mbps and 7.2 Mbps HSDPA) ADSP – 75 MHz and 90 MHz (for 3.6 Mbps and 7.2 Mbps HSDPA) MDSP – 61.44 MHz
Process technology	90 nm
Broadcast	TSIF (dedicated)
High speed serial interface	Mobile display digital interface (MDDI)
Security/digital rights management	OMA DRM v2.0 Q-fuse supported
Supported RF platforms	Tri-band UMTS (3U), Platform B (RFCMOS), Platform D (Diversity)
gpsOne	Supported
16-bit burst NOR flash + 16-bit or 32-bit burst PSRAM	Not supported
8-bit or 16-bit NAND flash + 32-bit SDRAM	Supported Only 32-bit SDRAM supported
USB	USB-OTG
Qcamcorder	15 fps @ QVGA, 15 fps QVGA viewfinder
Qtv (video decode)	30 fps @ QVGA playback 15 fps @ QVGA streaming
Qvideophone (video telephony)	15 fps @ QCIF
Qcamera (camera interface)	4M pixel support
Audio/video decoders	MP3, AAC, AAC+, Enhanced AAC+ ADPCM, MP4, H.263, H.264, Windows Media, Real
2D/3D graphics HW acceleration	HW – 100K triangles/sec

Table 3.6 Summary of ESM6270 device features

3.6.9 Serial Bus Interface(SBI)

The ESM6270 device's SSBI is designed specifically to be a quick, low pin count control protocol for QUALCOMM's RTR6235, RFR6275 and PM6635 ASICs. Using the SSBI, the RTR6235, RFR6275, and PM6635 devices can be configured for different operating modes and for minimum power consumption, extending battery life in Standby mode. The SSBI also controls DC baseband offset errors.

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3.6.10 Wideband CODEC

The ESM6270 device integrates a wideband voice/audio CODEC into the mobile station modem (ESM). The CODEC supports two differential microphone inputs, one differential earphone output, one single-ended earphone output, and a differential analog auxiliary interface.

The CODEC integrates the microphone and earphone amplifiers into the ESM6270 device, reducing the external component count to just a few passive components.

The microphone (Tx) audio path consists of a two-stage amplifier with the gain of the second stage set internally. The Rx/Tx paths are designed to meet the ITU-G.712 requirements for digital transmission systems.

3.6.11 Vocoder Subsystem

The ESM6270 device's QDSP4000 supports AMR, FR, EFR and HR. In addition, the QDSP4000 has modules to support the following audio functions: DTMF tone generation, DTMF tone detection, Tx/Rx volume controls, Tx/Rx automatic gain control (AGC), Rx Automatic Volume Control (AVC), EarSeal Echo Canceller (ESEC), Acoustic Echo Canceller (AEC), Noise Suppression (NS), and programmable, 13-tap, Type-I, FIR, Tx/Rx compensation filters. The ESM6270 device's integrated ARM9TDMI processor downloads the firmware into the QDSP4000 and configures QDSP4000 to support the desired functionality.

3.6.12 ARM Microprocessor subsystem

The ESM6270 device uses an embedded ARM926EJ-S microprocessor. This microprocessor, through the system software, controls most of the functionality for the ESM device, including control of the external peripherals such as the keypad, LCD, RAM, ROM, and EEPROM devices.

Through a generic single serial bus interface (SSBI) the ARM926EJ-S configures and controls the functionality of the RFR6275, RTR6235, and PM6635 devices.

3.6.13 Mode Select and JTAG Interfaces

The mode pins to the ESM6270 device determine the overall operating mode of the ASIC. The options under the control of the mode inputs are Native mode, which is the normal subscriber unit operation, ETM mode, which enables the built-in trace mode, and test mode for factory testing.

The ESM6270 device meets the intent of the ANSI/IEEE 1149.1A-1993 feature list. The JTAG interface can be used to test digital interconnects between devices within the mobile station during manufacture.

3.6.14 General-Purpose Input/Output Interface

The ESM6270 device has general-purpose bidirectional input/output pins. Some of the GPIO pins have alternate functions supported on them. The alternate functions include USB interface, additional RAM, ROM, general-purpose chip selects, parallel LCD interface, and a UART interface. The function of these pins is documented in the various software releases.

3.6.15 UART

The ESM6270 device employs three UARTs. UART1 has dedicated pins while UART2 and UART3 share multiplexed pins.

- UART1 for data
- UART2 (can be used for SIM interface)
- UART3 for data

3.6.16 USB

The ESM6270 device integrates a universal serial bus (USB) controller that supports both unidirectional and bidirectional transceiver interfaces. The USB controller acts as a USB peripheral communicating with the USB host.

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3.7 Power Block

3.7.1 General

ESM6270, included RF, is fully covered by PM6635(Qualcomm PMIC). PM6635 cover the power of ESM6270, ESM memory, RF block, Bluetooth, SIM and TCXO.

Major power components are :

PM6635 : Phone power supply

AAT3169 : LCD Backlight/Flash charge pump

3.7.2 PM6635

The PM6635 device (Figure 3.7) integrates all wireless handset power management. The power management portion accepts power from all the most common sources - battery, external charger, adapter, coin cell back-up - and generates all the regulated voltages needed to power the appropriate handset electronics. It monitors and controls the power sources, detecting which sources are applied, verifying that they are within acceptable operational limits, and coordinates battery and coin cell recharging while maintaining the handset electronics supply voltages. Eight programmable output voltages are generated using low dropout voltage regulators, all derived from a common trimmed voltage reference.

A dedicated controller manages the TCXO warm-up and signal buffering, and key parameters (under-voltage lockout and crystal oscillator signal presence) are monitored to protect against detrimental conditions.

ESM device controls and statuses the PM6635 IC using Single Serial Bus Interface (SSBI) supplemented by an Interrupt Manager for time-critical information. Another dedicated IC Interface circuit monitors multiple trigger events and controls the power-on sequence.

3. TECHNICAL BRIEF

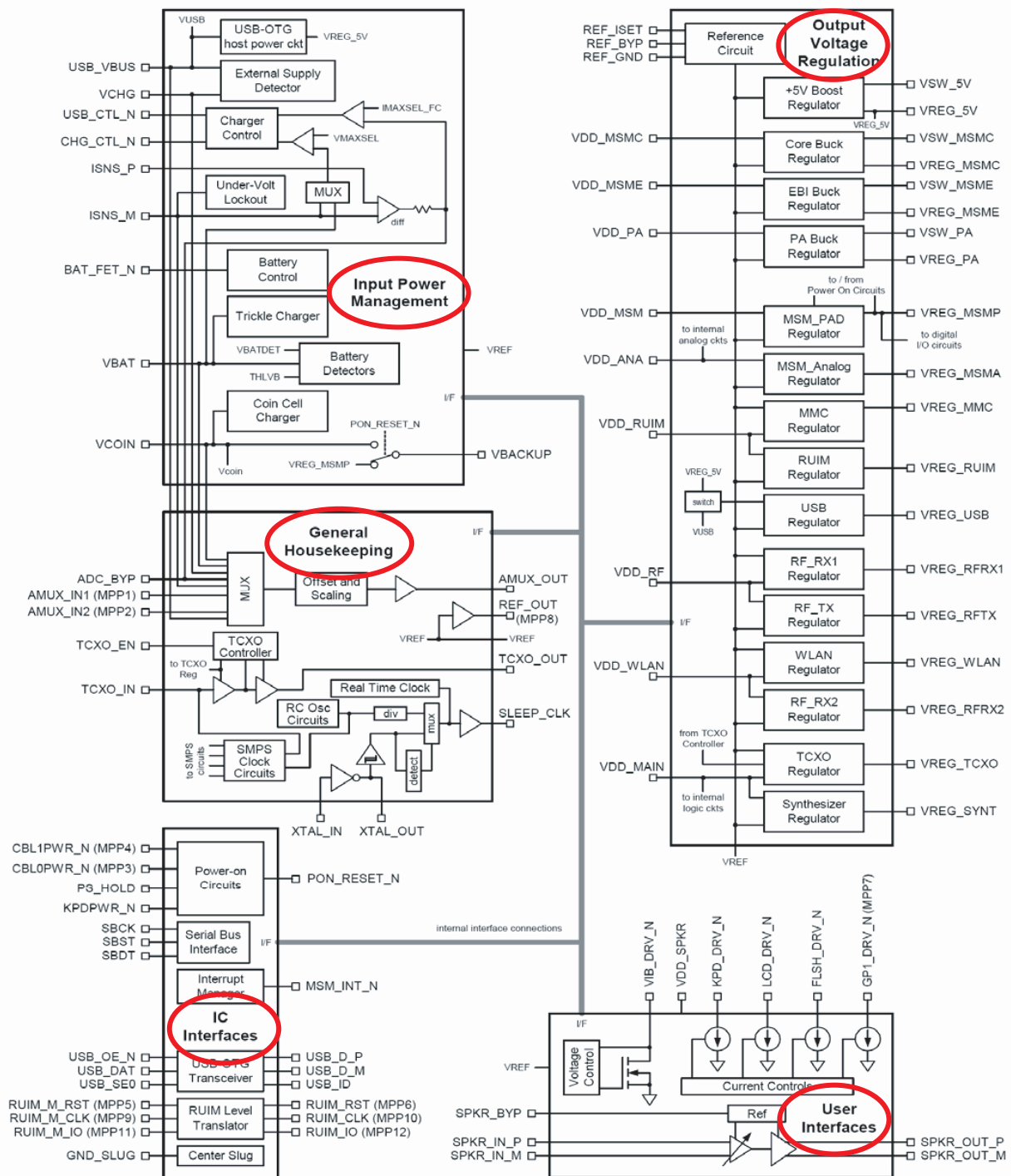
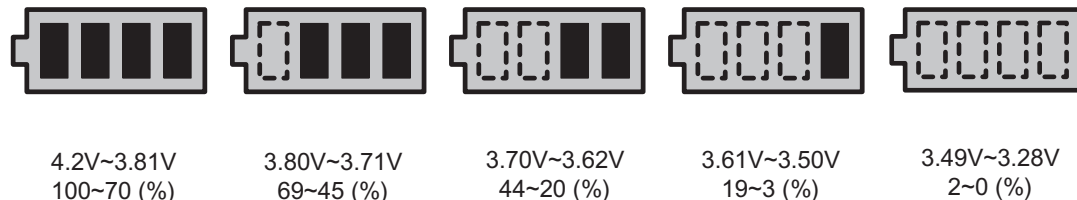


Figure 3.7. PM6635 Functional Block Diagram

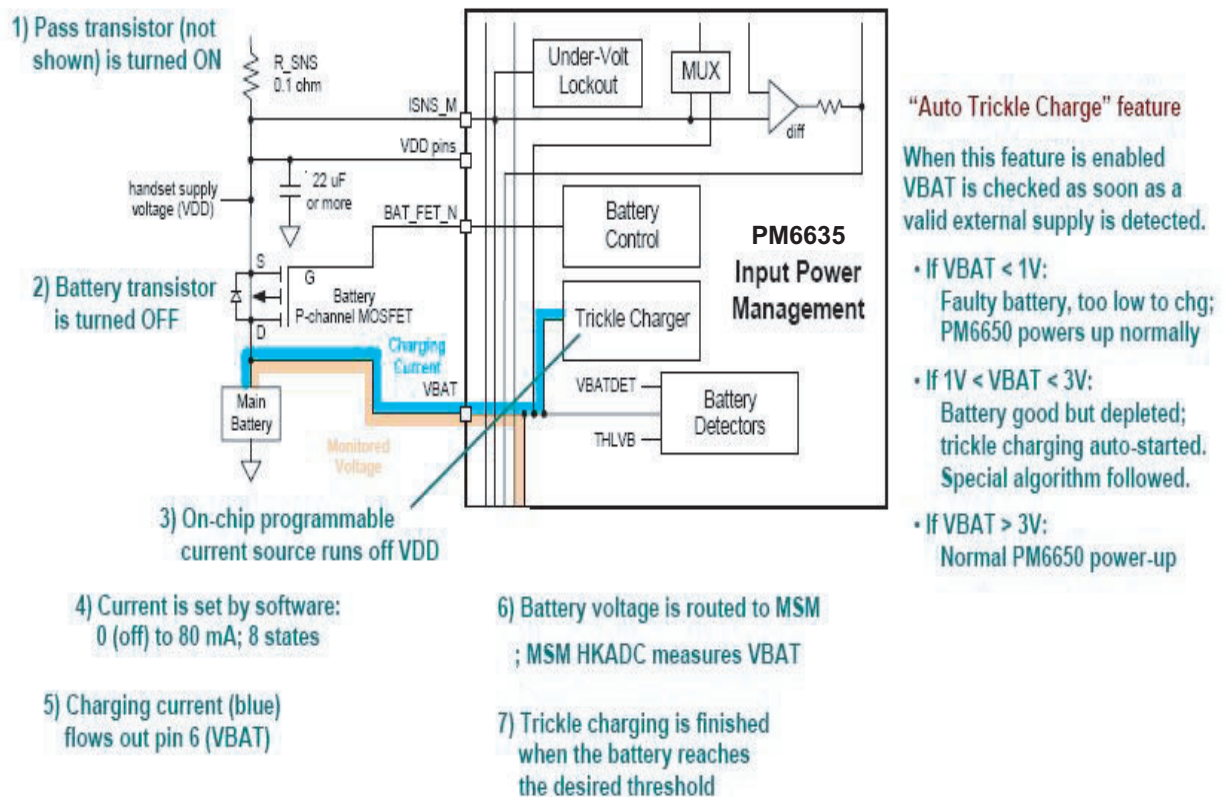
A programmable charging block in PM6635 is used for battery charging. It is possible to set limits for the charging current. The external supply typically connects directly to pin (VCHG). The voltage on this pin (VCHG) is monitored by detection circuitry to ascertain whether a valid external supply is applied or not.



Trickle Charging

Trickle Charging of the main battery, enabled through SBI control and powered from VDD, is provided by the PM6635 IC. The trickle charger is on-chip programmable current source that supplies current from VDD to pin (VBAT). Trickle charging can be used for lithium-ion and nickel-based batteries, with its performance specified below (3.2V). The charging current is set to 80mA.

Parameter	Min	Typ	Max	Unit
Trickle Current	60	80	100	mA



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Constant Current Charging

The PM6635 IC supports constant current charging of the main battery by controlling the charger pass transistor and the battery transistor. The constant current charging continues until the battery reaches its target voltage, 4.2V.

Constant Voltage Charging

Constant voltage charging begins when the battery voltage reaches a target voltage, 4.2V.

The end of constant voltage charging is commonly detected 10% of the full charging current.

- Charging Method : CC & CV (Constant Current & Constant Voltage)
- Maximum Charging Voltage : 4.2V
- Maximum Charging Current : 600mA
- Nominal Battery Capacity : 1000mAh
- Charger Voltage : 5.1V
- Charging time : Max 3h (Except time trickle charging)
- Full charge indication current (icon stop current) : 100mA
- Low battery POP UP : Idle - 3.49V, Dedicated(GSM/WCDMA) - 3.49V
- Low battery alarm interval : Idle - 3 min, Dedicated - 1min
- Cut-off voltage : 3.20V(idle), 3.1V(call)

3.8 External memory interface

The ESM6270 device was designed to provide two distinct memory interfaces. EBI1 was targeted for supporting high speed synchronous memory devices. EBI2 was targeted towards supporting slower asynchronous devices such as LCD, NAND flash, SRAM, etc. In addition, ESM6270 provide SD bus interface. KE990 supports 512MByte free user memory using SD interface.

- EBI1 Features

- 16 bit static and dynamic memory interface
- 32 bit dynamic memory interface
- 24 bits of address for static memory devices which can support up to 32MBytes on each chip select
- Synchronous burst memories supported (burst NOR, burst PSRAM)
- Synchronous DRAM memories supported
- Byte addressable memory supporting 8 bit, 16 bit and 32 bit accesses
- Pseudo SRAM (PSRAM) memory support

- EBI2 Features

- Support for asynchronous FLASH and SRAM(16bit & 8bit).
- Interface support for byte addressable 16bit devices (UB_N & LB_N signals).
- 2Mbytes of memory per chip select.
- Support for 8 bit/16bit wide NAND flash.
- Support for parallel LCD interfaces, port mapped or memory mapped(18 or 16 bit).
 - 2Gb NAND(16bit, Large Block) flash memory + 1Gb SDRAM (32bit)
 - 1-CS(Chip Select) are used.

- The SD bus allows the dynamic configuration of the number of data line from 1 to 4 Bidirectional data signal. After power up by default, the Device will use only DAT0. After initialization, host can change the bus width.

Interface Spec				
Device	Part Name	Maker	Read Access Time	Write Access Time
FLASH	TYA000BC00DOGG	Toshiba	50 ns	30 ns
SDRAM	TYA000BC00DOGG	Toshiba	15 ns	15 ns

Table 3.8. External memory interface

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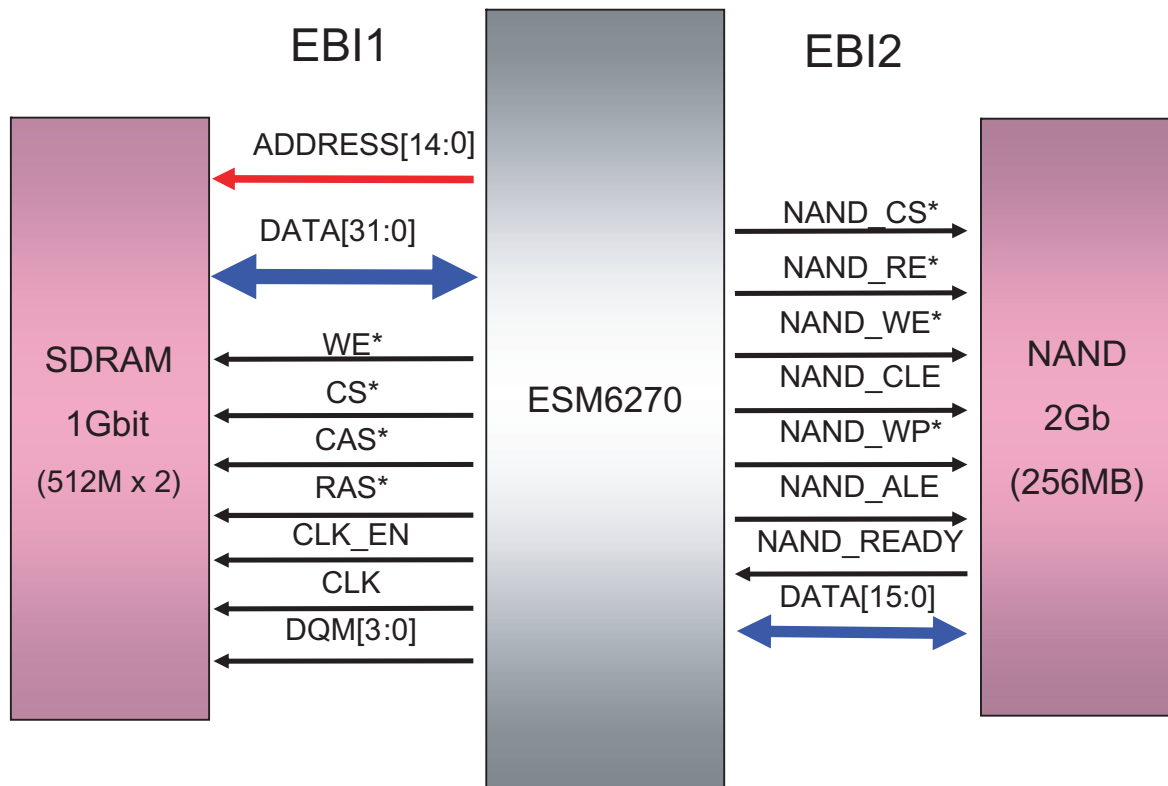


Figure. Simplified Block Diagram of Memory Interface

3.9 H/W Sub System

3.9.1 RF Interface

A. RTR6235(WCDMA_Tx, GSM_Tx/Rx)

ESM6270 controls RF part(RTR6235) using these signals.

- SBST : SSBI I/F signals for control Sub-chipset
- PA_ON1 : Power AMP on RF part
- RX0_I/Q_M/P, TX_I/Q_M/P : I/Q for T/Rx of RF
- TX_AGC_ADJ : control the gain of the Tx signal prior to the power amplifier
- DAC_REF : Reference input to the ESM Tx data DACs

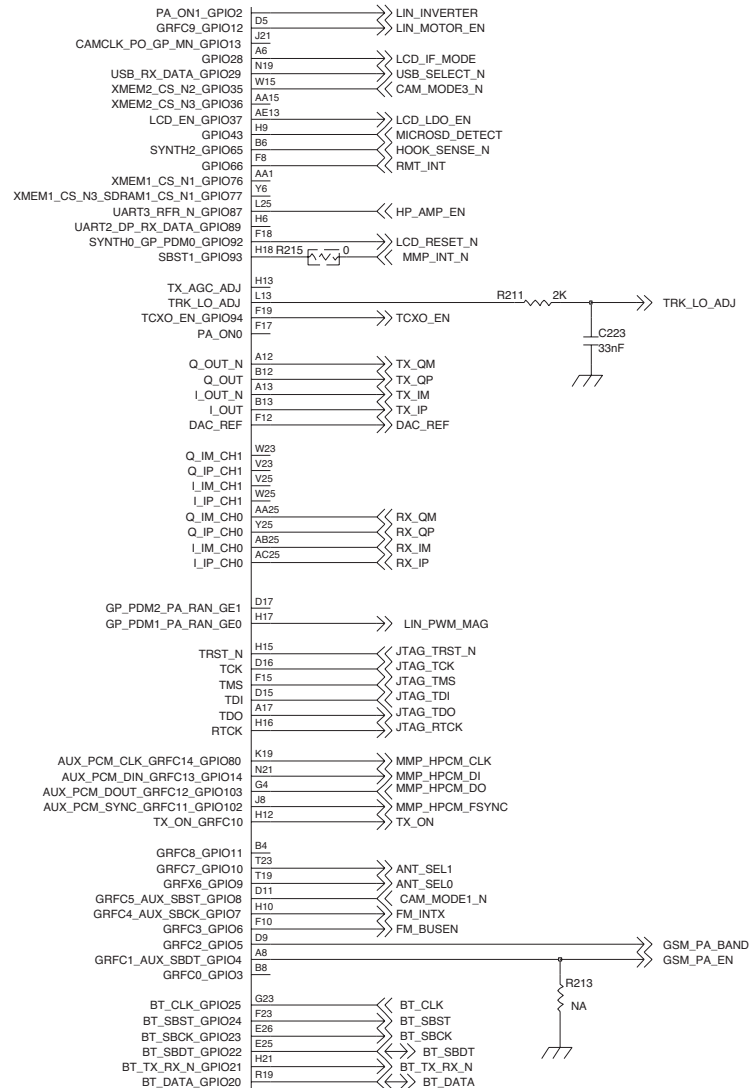


Figure. Schematic of RF Interface of ESM6270

3. TECHNICAL BRIEF

B. the others

- TRK_LO_ADJ : TCXO(19.2M) Control
- PA_ON : WCDMA(2100) TX Power Amp Enable
- ANT_SEL[0-2] : Ant Switch Module Mode Selection(WCDMA,GSM Tx/Rx,DCS-PCS Tx/Rx)
- GSM_PA_BAND : GSM/DCS-PCS Band Selection of Power Amp
- GSM_PA_RAMP : Power Amp Gain Control of APC_IC
- GSM_PA_EN : Power Amp Gain Control Enable of APC_IC

3.9.2 MSM Sub System

3.9.2.1 SIM Interface

SIM interface scheme is shown in Figure.

And, there control signals are followed

- SIM_CLK : SIM Clock
- SIM_Reset : SIM Reset
- SIM_Data : SIM Data T/Rx

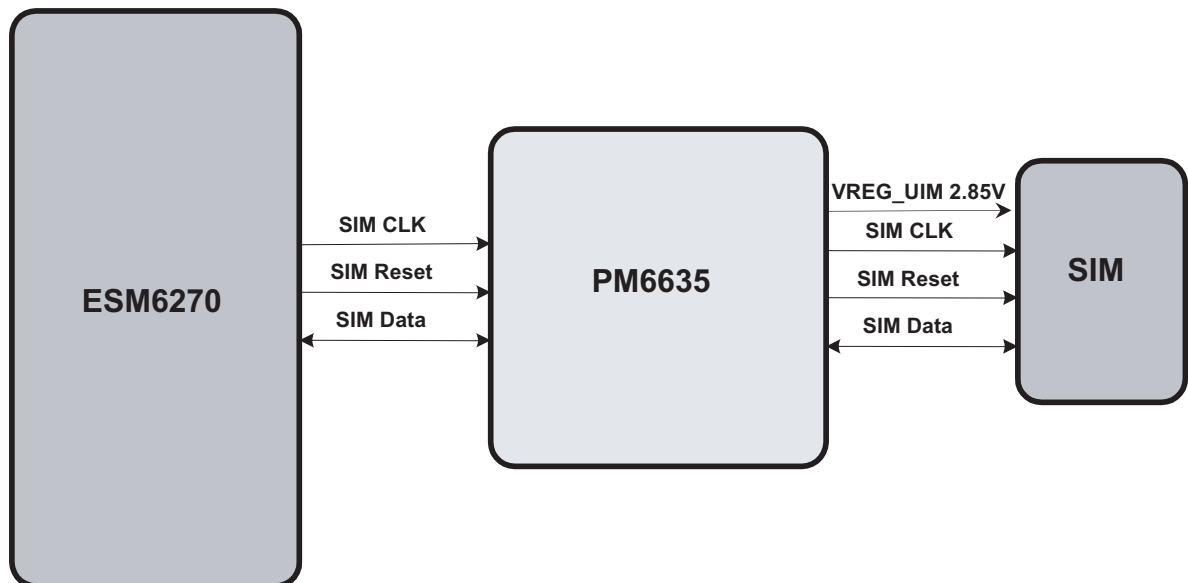


Figure. SIM Interface

3.9.2.2 UART Interface

UART signals are connected to ESM GPIO through IO connector with 115200 bps speed.

GPIO_Map	Name	Note
GPIO_96	UART_RXD	Data_Rx
GPIO_95	UART_TXD	Data_Tx

Table. UART Interface

3. TECHNICAL BRIEF

3.9.2.3 USB

The ESM6270 device contains a Universal Serial Bus (USB) interface to provide an efficient interconnect between the mobile phone and a personal computer (PC). The USB interface of the ESM6270 was designed to comply with the definition of a peripheral as specified in USB Specification, Revision 1.1. Therefore, by definition, the USB interface is also compliant as a peripheral with the USB Specification, Revision 2.0.

The USB Specification Revision 1.1 defines two speeds of operation, namely low-speed (1.5 Mbps) and full-speed (12 Mbps), both of which are supported by the ESM6270.

Name	Note
USB_DAT	Data to/from ESM
USB_SE0	Data to/from ESM
USB_OE_N	Out-Put Enable of Transceiver
USB_VBUS	USB_Power From Host(PC)
USB_D+	USB Data+ to Host
USB_D-	USB Data- to Host

Table. USB Signal Interface

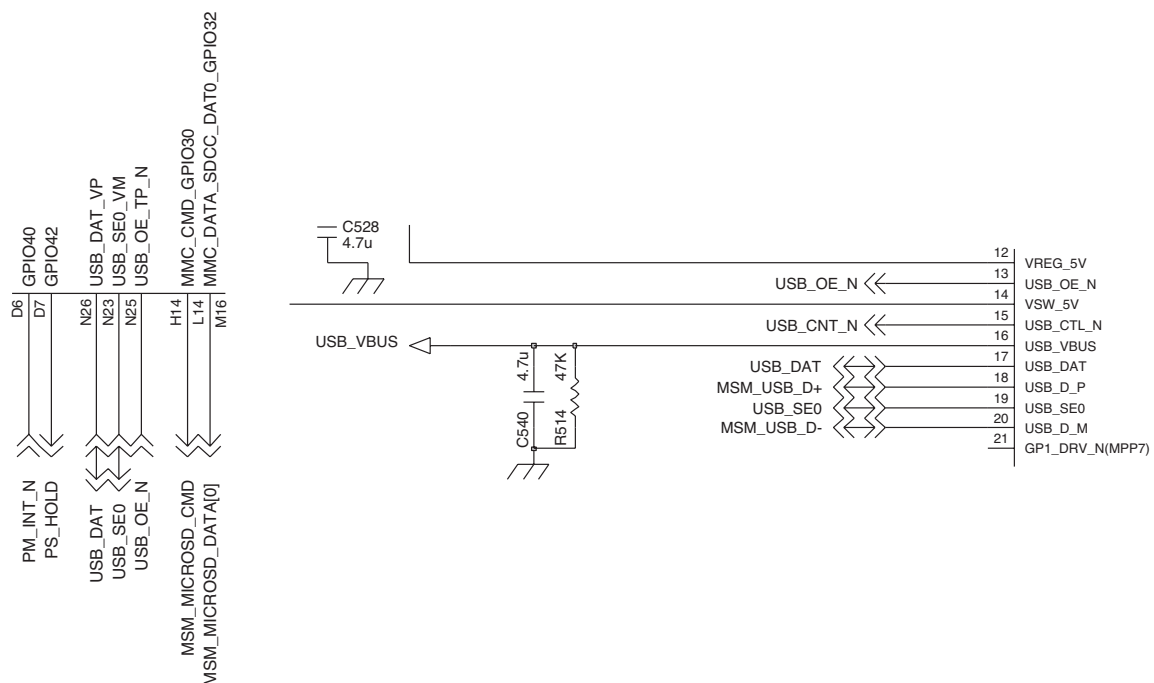


Figure. Schematic of USB block(ESM6270 Side & PM6635 Side)

3.9.3 HKADC(House Keeping ADC)

The ESM6270 device has an on-chip 8-bit analog-to-digital converter (HKADC) which is tended to digitize DC signals corresponding to analog parameters such as battery voltage, temperature, and RF power levels. The ESM6270 device has six analog input pins which are multiplexed to the input of the internal HKADC.

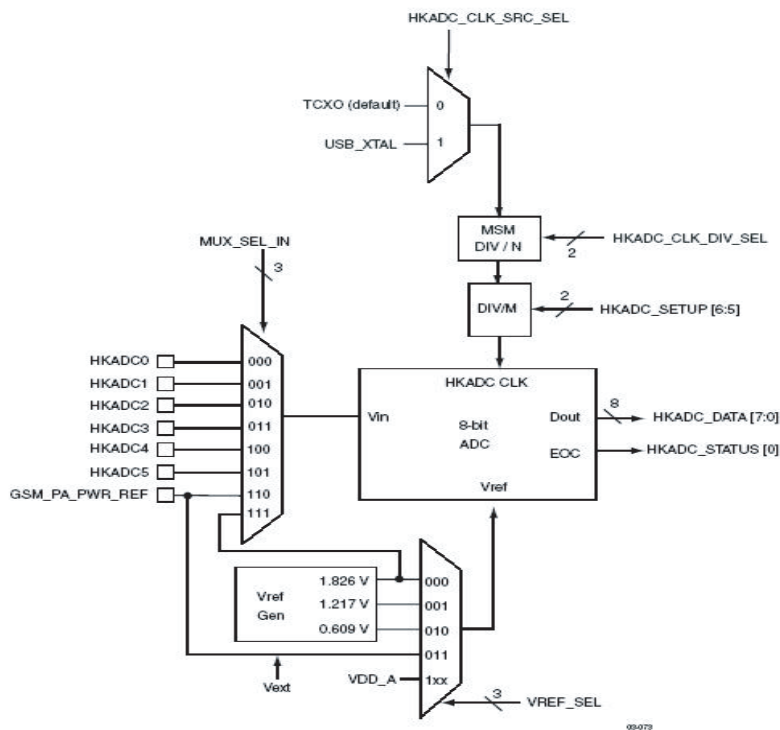


Figure. ESM6270HKADC Block diagram

Channel	Signal	Note
HKADC0	AMUX_OUT	RF PAM Temperature Check
HKADC1	VBATT_SENSE	Battery voltage level
HKADC2	REF_ADC	ADC Reference voltage
HKADC3	TTY_ADC_DET	Ear jack Detection for TTY
HKADC4	PCB_Rev_ADC	PCB Version Check
HKADC5	Battery_THERM	Battery Temperature Check

Table. HKADC channel table

3. TECHNICAL BRIEF

3.9.4 Key Pad

There are 5 key buttons. Shows the Key Matrix & Keypad circuit. 'END' Key is connected to PMIC(PM6635).

	COL(0)	COL(1)
ROW(0)	Lock	Capture
ROW(1)		AF
ROW(2)	SEND	CLR

Table. Key Matrix Mapping Table

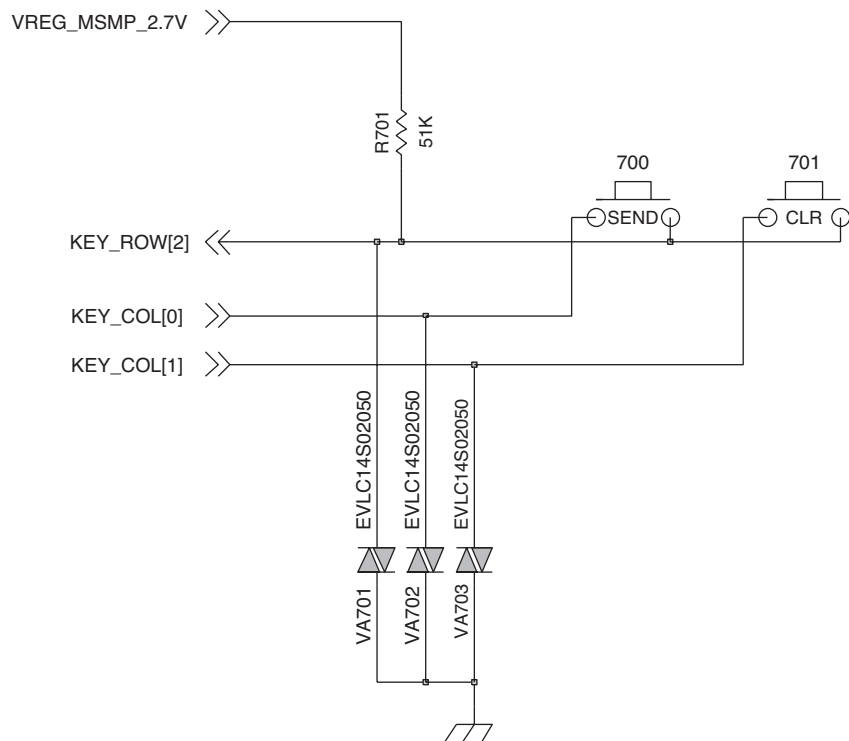


Figure. Main Keypad Circuit

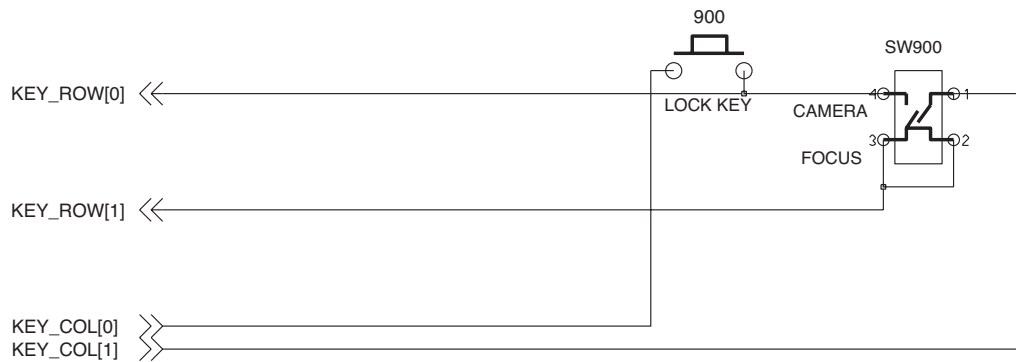


Figure. Side Keypad Circuit

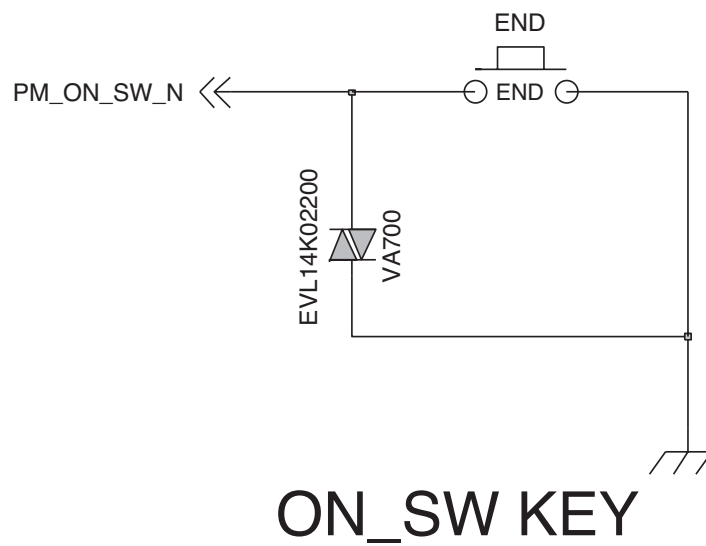


Figure. END Keypad Circuit

Below figure shows the camera board to board connector and camera I/F signal.

5M CAMERA INTERFACE

The schematic diagram illustrates the 5M Camera Interface. It shows the connection between the MMP camera module (left) and the GB042-30S-H10-E3000 camera module (center). The MMP module provides various signals including I2C (SCL, SDA), camera control signals (VSYNC, HSYNC, RESET_N, STROBE_TRIGGER), and data signals (5M_CAM_DATA[6], 5M_CAM_DATA[4], 5M_CAM_DATA[2], 5M_CAM_DATA[0], MMP_CAM_MCLK). The GB042-30S-H10-E3000 module has pins for power supply (CAM_VDD_CORE_1.2V, CAM_VDD_SA_2.7V, CAM_VDD_SD_1.8V, CAM_VDD_IO_2.7V, CAM_VDD_AF_2.7V), ground, and signals (MMP_CAM_INT, 5M_CAM_DATA[7], 5M_CAM_DATA[5], 5M_CAM_DATA[3], 5M_CAM_DATA[1], MMP_CAM_PCLK). The diagram also shows various components like resistors (R601, R602, R603, R604, R607, R608), capacitors (C601, C602, C600, C605, C609, C608, C606, C607, C610, C611, C612, C613, C614), and diodes (VA600, VA601, VA602).

Figure. Camera PCB Board to Board Connector

3. TECHNICAL BRIEF

The MEGA Camera module is connected to Main PCB with 30pin Board to Board connector Its interface is dedicated camera interface port in Multimedia chip. The camera port supply 13MHz master clock to camera module, vertical sync signal, horizontal sync signal, reset signal and 8bits data from camera module. The camera module is controlled by I2C port from Multimedia chip.

[Pin Description]

No	Symbol	I/O	State at reset	State at power save	State at power off	Description
1	AF_GND	-	-	-	-	Ground(Auto Focus)
2	GND	-	-	-	-	Ground
3	VDD_AF(2.8V)	-	-	-	-	Voltage Supply(Auto Focus)
4	SCL	I/O	HiZ	Active	HiZ	I ² C Serial Bus Clock
5	GND	-	-	-	-	Ground
6	SDA	I/O	HiZ	Active	HiZ	I ² C Serial Bus Data I/O
7	VDD_SA(2.8V)	-	-	-	-	Voltage Supply(Sensor Analog)
8	VSYNC	O	Low	HiZ	HiZ	Vertical Synchronization Signal
9	VDD_IO(2.8or1.8V)	-	-	-	-	Voltage Supply(I/O)
10	HSYNC	O	Low	HiZ	HiZ	Horizontal Synchronization Signal
11	TRIG	O	Low	Low	Low	Interrupt Line Signal
12	XRST	I	-	-	-	System Reset
13	GND	-	-	-	-	Ground
14	STRB	O	Low	Low	Low	LED/Xenon Strobe Contol
15	D[7]	O	Low	HiZ	HiZ	Digital Video Data(MSB)
16	D[6]	O	Low	HiZ	HiZ	Digital Video Data
17	D[5]	O	Low	HiZ	HiZ	Digital Video Data
18	D[4]	O	Low	HiZ	HiZ	Digital Video Data
19	D[3]	O	Low	HiZ	HiZ	Digital Video Data
20	D[2]	O	Low	HiZ	HiZ	Digital Video Data
21	D[1]	O	Low	HiZ	HiZ	Digital Video Data
22	D[0]	O	Low	HiZ	HiZ	Digital Video Data(LSB)
23	VDD_SD(1.8V)	-	-	-	-	Voltage Supply(Sensor Digital)
24	GND	-	-	-	-	Ground
25	DCK	O	Low	HiZ	HiZ	Digital Video Data Clock
26	MCK	I	-	-	-	System Clock Input
27	GND	-	-	-	-	Ground
28	VDD_L(1.2V)	-	-	-	-	Voltage Supply(DSP Core)

Table. Interface between MEGA Camera Module and MAIN PCB (in camera module)

3. TECHNICAL BRIEF

3.9.6 LCD Module (LS030B3UX01 : SHARP)

- The IM220DBN2A model is a Color TFT Main supplied by SHARP.

This LCD Module has a 3.0 inch diagonally measured active display area with 240(RGB)X400 resolution. each pixel is divided into Red, Green and Blue sub-pixels and dots which are arranged in vertical stripes.

* Features

- Display mode(Main LCD) : Normally Black, Transmissive VA mode 265K colors
- LCD Driver IC : LS030B3UX01(Magnachip)
- Driving Method : A-Si TFT Active Matrix
- 16 bit CPU interface Parallel

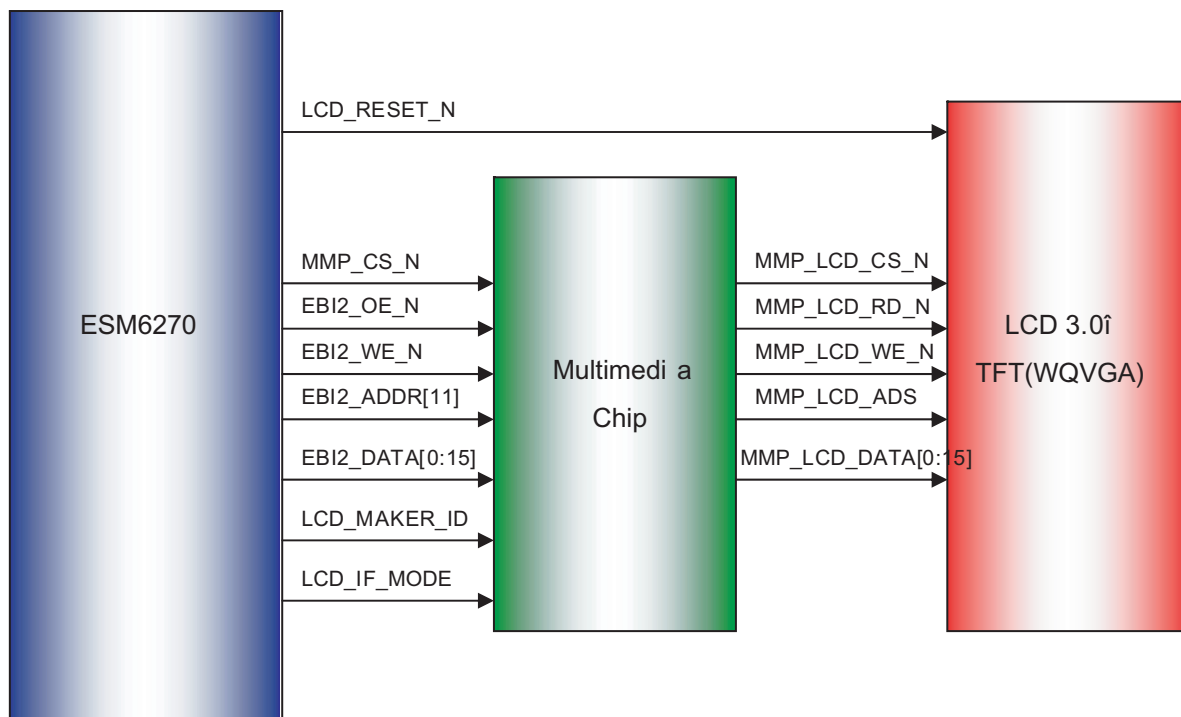
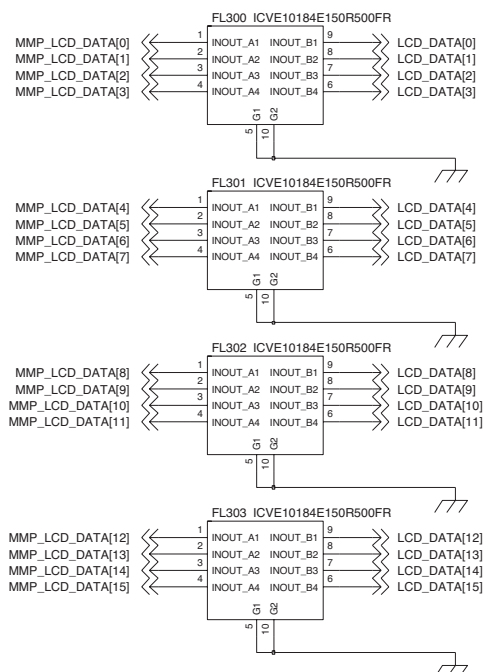
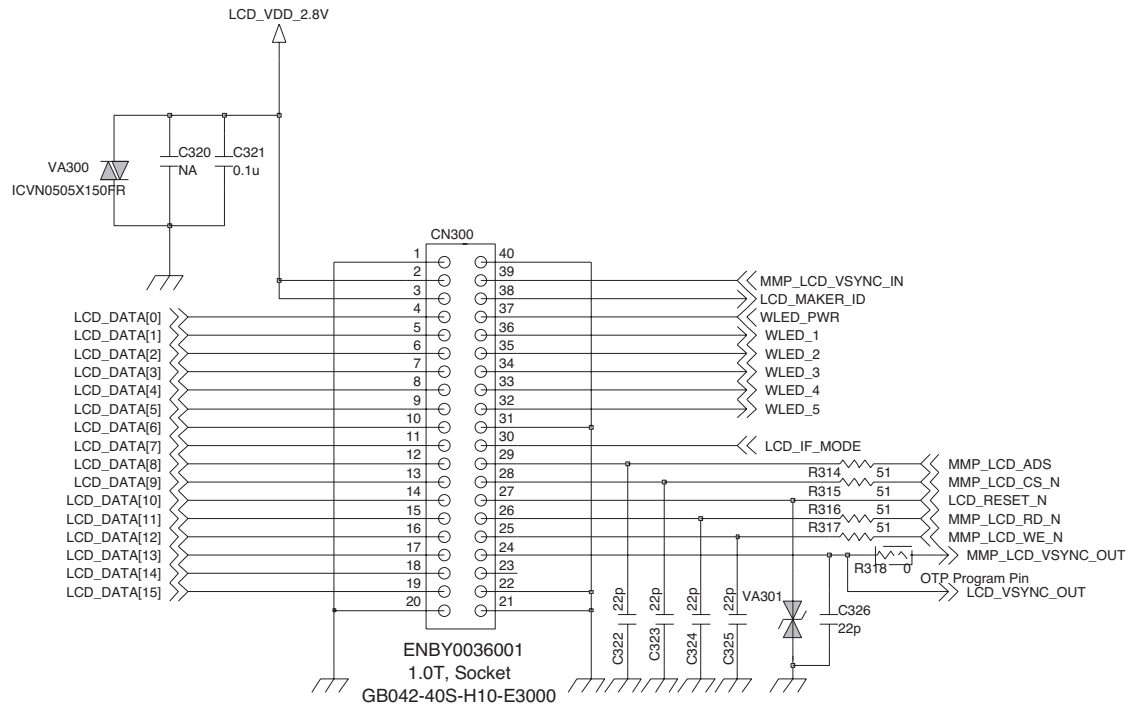


Figure. LCD Module Block Diagram

3.9.7 Display

LCD module is connected to Main PCB with 40 pin B TO B connector.

The LCD module is controlled by 16-bit EBI2 in ESM6270 via Multimedia Chip.



3. TECHNICAL BRIEF

3.9.7.1 Audio Signal Processing & Interface

Audio signal processing is divided uplink path and downlink path.

The uplink path amplifies the audio signal from MIC and converts this analog signal to digital signal and then transmits it to DBB Chip (ESM6270).

This transmitted signal is reformed to fit in GSM & WCDMA frame format and delivered to RF Chipset. The downlink path amplifies the signal from DBB chip (ESM6270) and outputs it to receiver (or speaker).

The receive path can be directed to either one of two earphone amplifiers or the auxiliary output.

The outputs earphone1 (EAR1OP, EAR1ON) and auxiliary out (LINE_OP, LINE_ON) are differential outputs. Earphone2 (HPH_L, HPH_R) is a single-ended output stage designed to drive a headset speaker.

The microphone interface consists of two differential microphone inputs, one differential auxiliary input and a two-stage audio amplifier.

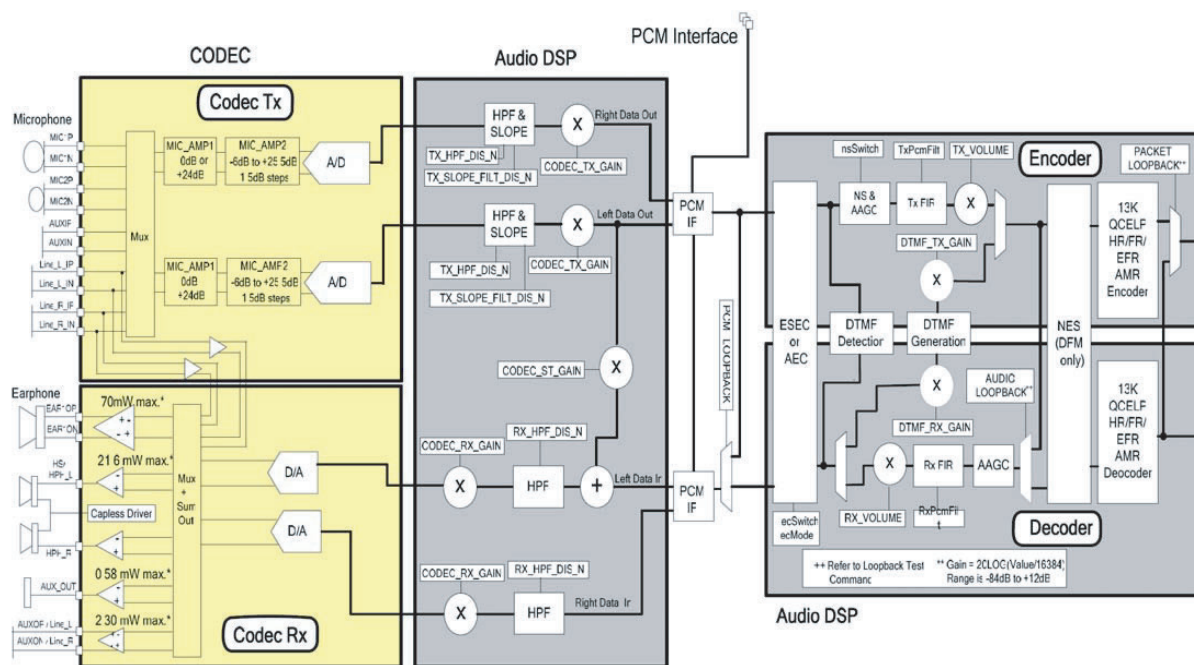


Figure. Audio Interface Detailed Diagram(ESM6270)

ESM6270 Audio CODEC pins

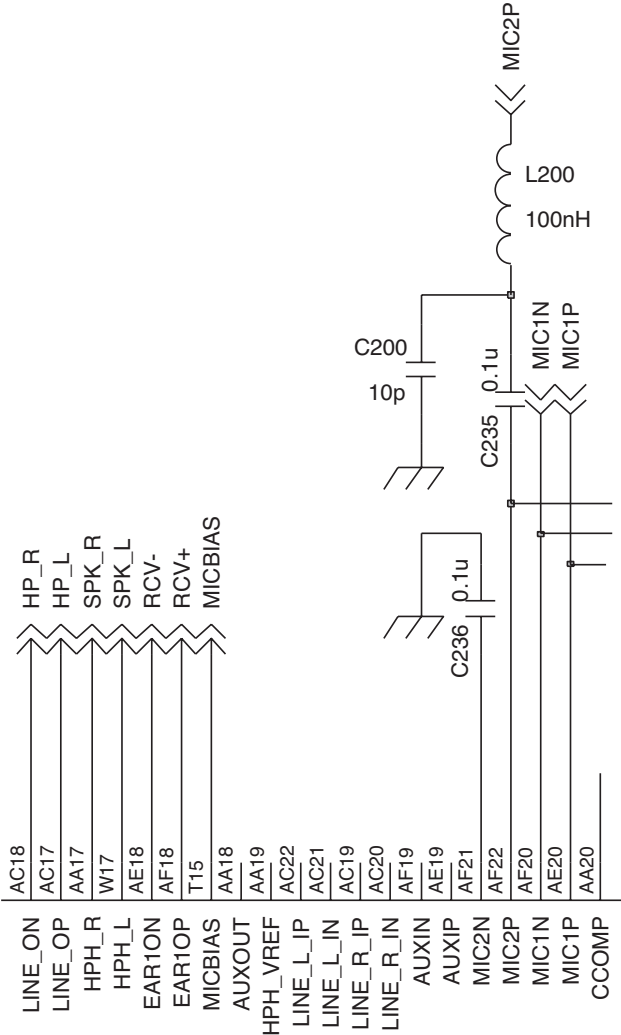


Figure . Audio part schematics

3. TECHNICAL BRIEF

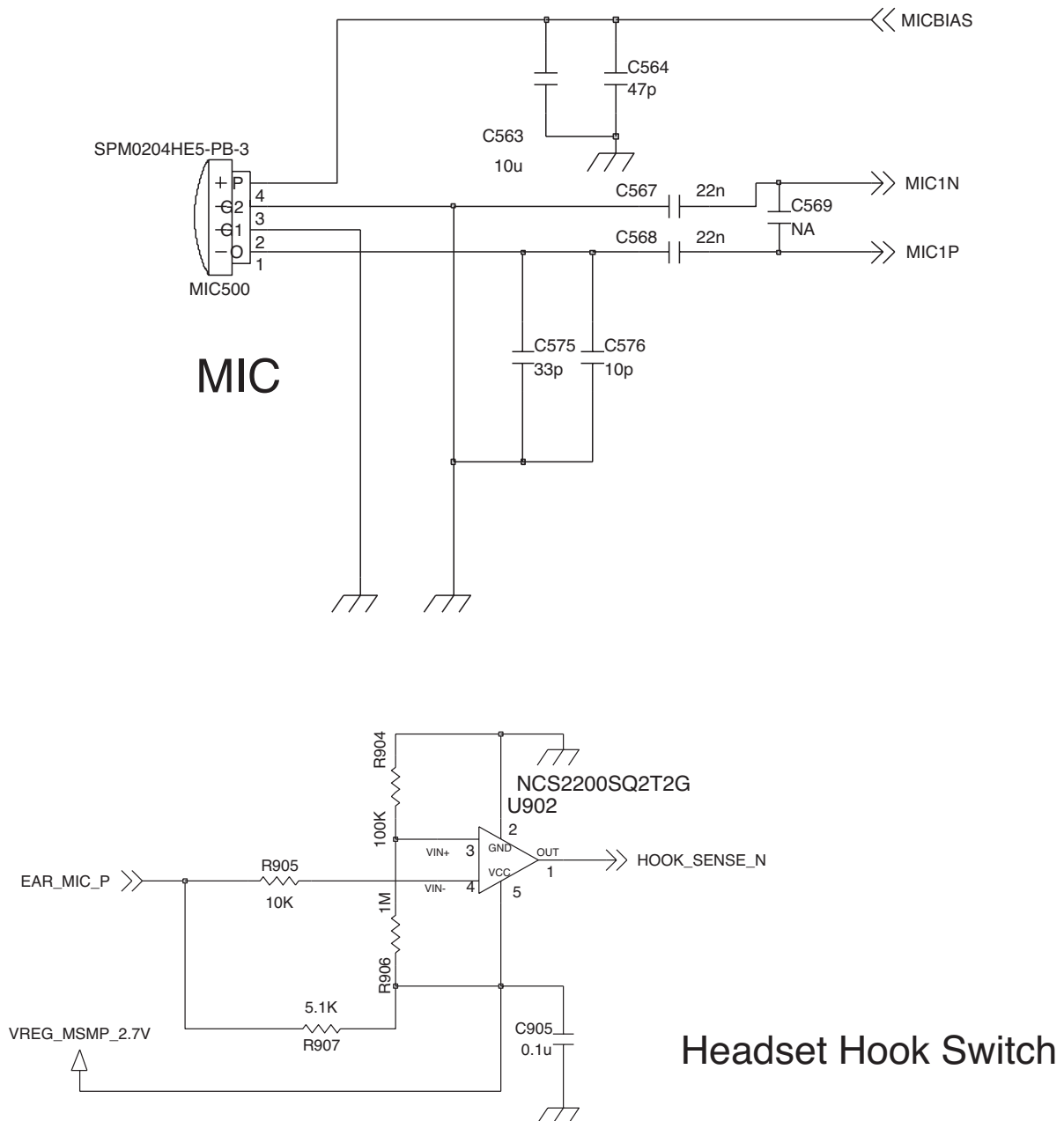
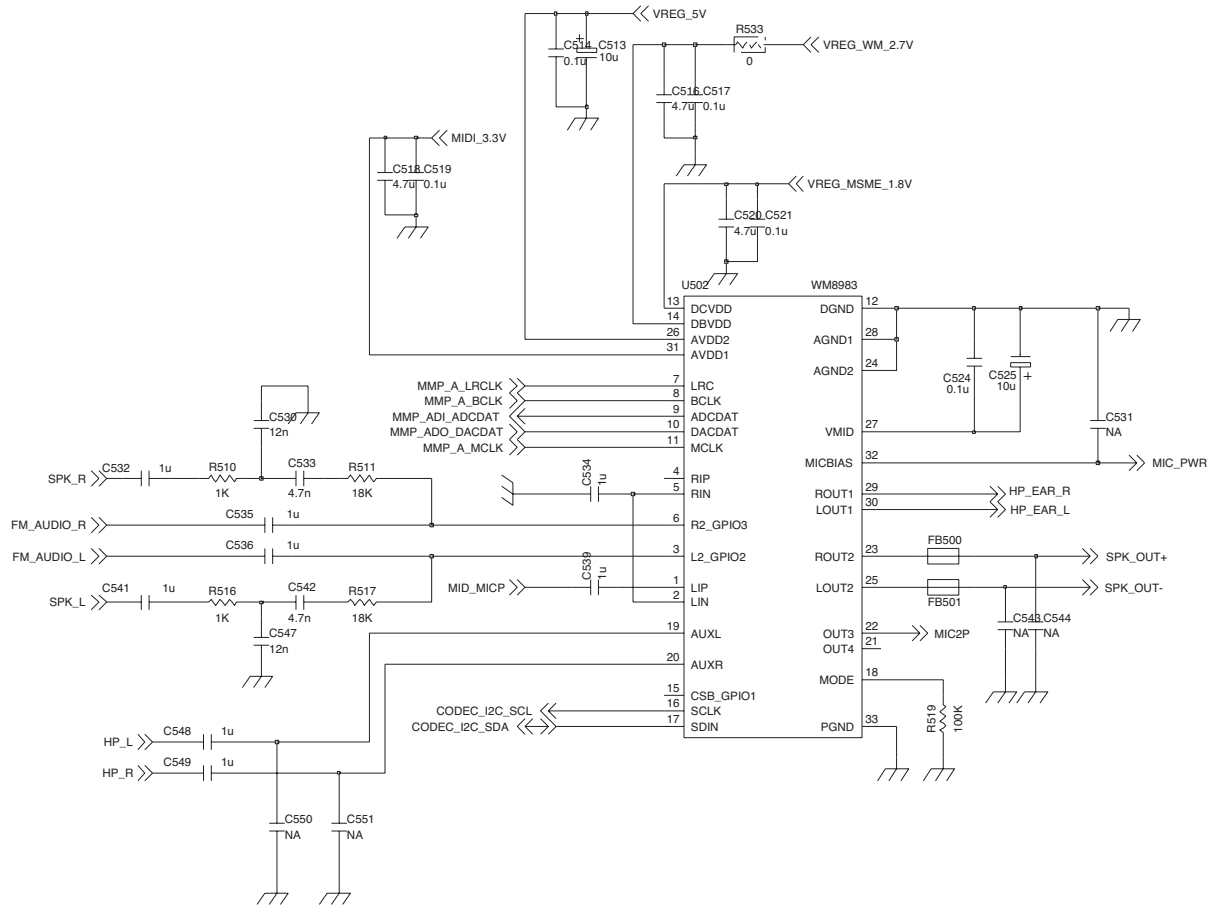


Figure . Audio part schematics

3. TECHNICAL BRIEF



AUDIO DAC/ADC, AMP etc. (WM8983)

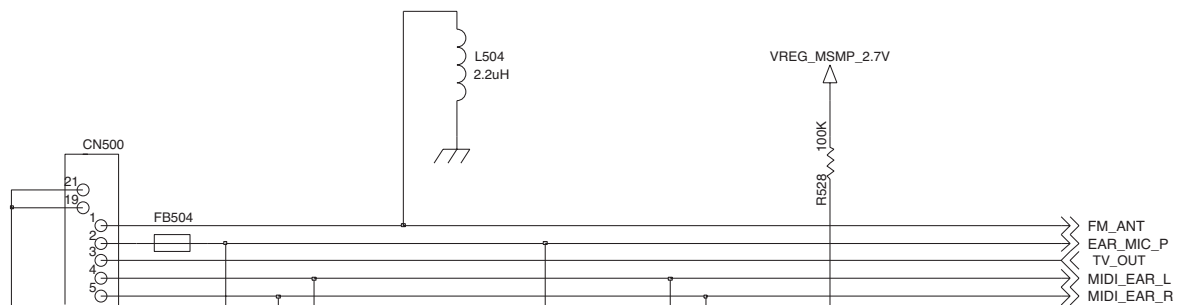


Figure . Audio part schematics

3. TECHNICAL BRIEF

3.9.7.2. Audio Mode

There are three audio modes (Voice call, speaker phone, MIDI/MP3).

MODE	Device	Description
Voice Call	Receiver Mode	Receiver Voice Call
	Loud Mode	Speaker Phone
	Headset	Headset Voice Call
Speaker phone	Loud Mode	Speaker Phone
MIDI	Loud Mode	Speaker MIDI Bell
	Headset	Headset MIDI Bell
MP3	Loud Mode	Speaker MP3
	Headset	Headset MP3

Table. Audio Mode

Audio & Sound Main Component

There are 8 main components in KE990.

	Component	Maker Part No.	Note
1	ESM6270	ESM6270	Base-Band Modem
2	Audio Codec	WM8983	ADC/DAC, AB class SPK AMP
3	Analog Switch	NC7SB3157L6X	Analog Switch for MIC BIAS
4	Speaker	EMS1634APB1	8 ohm Speaker
5	Receiver	EMR0906SP	32 ohm receiver
6	Main MIC	SPM0204HE5-PB	-42 dB microphone
7	CAM MIC	SPOB-413S42-RC3310BC	-42 dB microphone
8	Ear MIC	HC-MQD-LG059	Ear MIC

Table. Audio main component list

3.10 Feature List

3.10.1 IC Characteristics

- MCP with Internal SDRAM, no need for external memory.
- Package: 180-pin TFBGA (8 x 8 mm)
- 90nm process
- Core voltage - 1.0 V
- IO voltage - Eleven strips, separate voltage between 1.8 and 3.3 V

3.10.2 Multimedia Performance

- Digital Still Camera support with ISP on chip up to 5M pixel.
 - Photo-album and photo-editing capabilities.
 - Superior quality, (e.g. including lens shading).
 - Camera controls for flash, optical zoom, focus, shutter and iris.
- Camcorder operation as a DivX recorder /player at 30 fps CIF, VGA resolution. AVI file format with MP3 audio.
- Player for general DivX content, up to 30 fps CIF resolution. MP3 or WMA audio.
- 3GPP MMS compliant video clip recorder, supporting CIF/QCIF H.263, MPEG4 recording with AMR voice or AAC audio.
- Player for 3GPP MMS / streaming video clips, up to 30 fps CIF H.263, MPEG4, and H.264 with AMR voice or AAC/Enhanced AACPlus audio.
- 3GPP-compliant videophone, with H.263 or MPEG4 video\ at QCIF 15 fps (full-duplex).
- MIDI player (for ring tones, melodies).
Compliant with 3GPP standards, including support for Mobile XMF for melodies with custom instruments.
- Audio stereo recorder player MP3/WMA
- ID3 tags display
- Spectral bars
- Lyrics display
- Equalizer
- 3D Surround Audio

3. TECHNICAL BRIEF

3.10.3 DRM

- MDTV Conditional access compliant to JSR-177 (AES and TDES)
- Key exchange support
- True RNG (Random Number Generator)

3.10.4 3D Graphics

- 3D hardware + software accelerator targeting VGA 30 fps games with PlayStation™-1 enhanced quality.
 - Setup and viewport transforms
 - Bilinear and Trilinear texturing
 - Multi-texturing
 - Flat and Gourard shading
 - 24-bit ARGB support
 - Compressed textures (2 bits/texel)
 - Mipmapping
 - Full scene anti-aliasing (x4 / x16)
 - 16-bit Z-buffer
 - 4-bit stencil buffer
 - Fog
 - Alpha blending
 - Dot3 bump mapping
- Fill rate: 120M pixels/sec
- Polygon rate 0.8M triangles/sec

3.10.5 Image Sensor

- 10/12/14/16-bit RGB - Bayer Grid
 - CMOS up to 5MP
 - CCD up to 5MP
 - Pixel clock - Up to 90 MHz.
 - Active pixel rate - up to 75M pixels/sec:
 - 15fps @ 5MP
 - 25fps @ 3MP
 - 30fps @ 2MP
 - Black-level evaluation and correction
 - Defective pixel correction
 - Auto exposure and White-balance
 - Edge enhancement and auto focus.

- Lens shading correction
- Polyphase image scaling.
- Digital zoom up to X4 in 16 steps
- 8/16-bit YCbCr - 4:2:2
- Input streaming bus - as CCIR601
- Progressive (CMOS/CCD sensors) or interlaced (PAL/NTSC decoders) mode
- Pixel clock - Up to 120 MHz (8-bit), 60Mhz (16-bit)
- Input resolution - Up to 5M pixels
- Auto focus
- Polyphase image scaling
- Digital zoom up to X4 in 16 steps

3.10.6 LCD Port

- Output resolution - up to VGA
- Supports dual-panels (two LCDs)
- Bypass from Host port to LCD CPU bus
- Up to 18-bit color depth (262K colors)
- CPU bus 8/9/16/18 bit compliant to all known vendors.
- RGB bus 3/6/18 bit up to 30Mhz clock

3.10.7 TV-out Port

- Composite analog interface
 - NTSC-M
 - PAL-B,D,G,H,I

3.10.8 Video and Graphics Postprocessing

- Handles Video (YUV) and Graphic (RGB)
- Video de-blocking
- Blending of video and graphics - up to 256 levels of blending
- Resizing (upscale and downscale) using quality polyphase filter
- Rotation and flip - 90, 180 and 270 degrees
- Picture brightness, contrast, and saturation control
- Display gamma adjustment
- Color space reduction

3. TECHNICAL BRIEF

3.10.9 Serial Audio Ports

- ZR3453X has two audio/voice ports: one port is used for host bypass connection, and another for connecting to a codec or to a Bluetooth voice port.
 - PCM master/slave
 - I2S master/slave (5 lines including clock)
 - AC' 97 master (5 lines including AC-Link reset)
 - Audio output master clock (I2S), up to 48 MHz
 - Supports sample rates of 8, 11.025, 16, 22.05, 24, 32, 44.1 or 48 kHz

3.10.10 Serial Data Ports

- I2C Multiple device support 100 and 400 kHz
- UART with flow control up to 3Mb/sec
- SPI port with Bit clock up to 40 MHz
 - (Motorola, National microwire, TI synchronous serial interface)

3.10.11 Mass Storage

- High-speed SD/MMC I/F
- NAND-flash storage
- SPI-flash
- CE - ATA HDD.
- SDIO peripherals

3.10.12 USB

- USB 2.0 High speed/full speed
- USB On The Go
- USB applications:
 - USB mass storage
 - PictBridge
 - Webcam

3.10.13 Host Port

- Two flavors:
 - Generic interface 8/16-bit Intel style.
Connects as memory map (4-bit address)
 - LCD like 8/9/16 bit multiplexed bus.
Connects as an LCD (1-bit address)
- Bypass mode - From Host port up to two LCDs, audio codec and other peripherals
- Support for messaging and data transfers (DMA)

3.10.14 Clocks

- Main clock input frequency, 10 to 31 MHz:
 - Directly from system PMU main clock and bypass its control
 - Embedded crystal oscillator (12Mhz)
 - Optional GPS TCXO
- Four configurable clock-out pins to drive external components:
e.g. Audio codec, Sensor, PWM)

3.10.15 Boot

- Host boot
- Standalone boot

3.10.16 Debug

- JTAG for code debug
- UART for fast system ramp up

3.10.17 Power

- Very low power consumption, smaller than 150mW for all intense multimedia applications.
- Low power sleep mode 100 μ W
 - Host can control display audio and peripherals via bypass

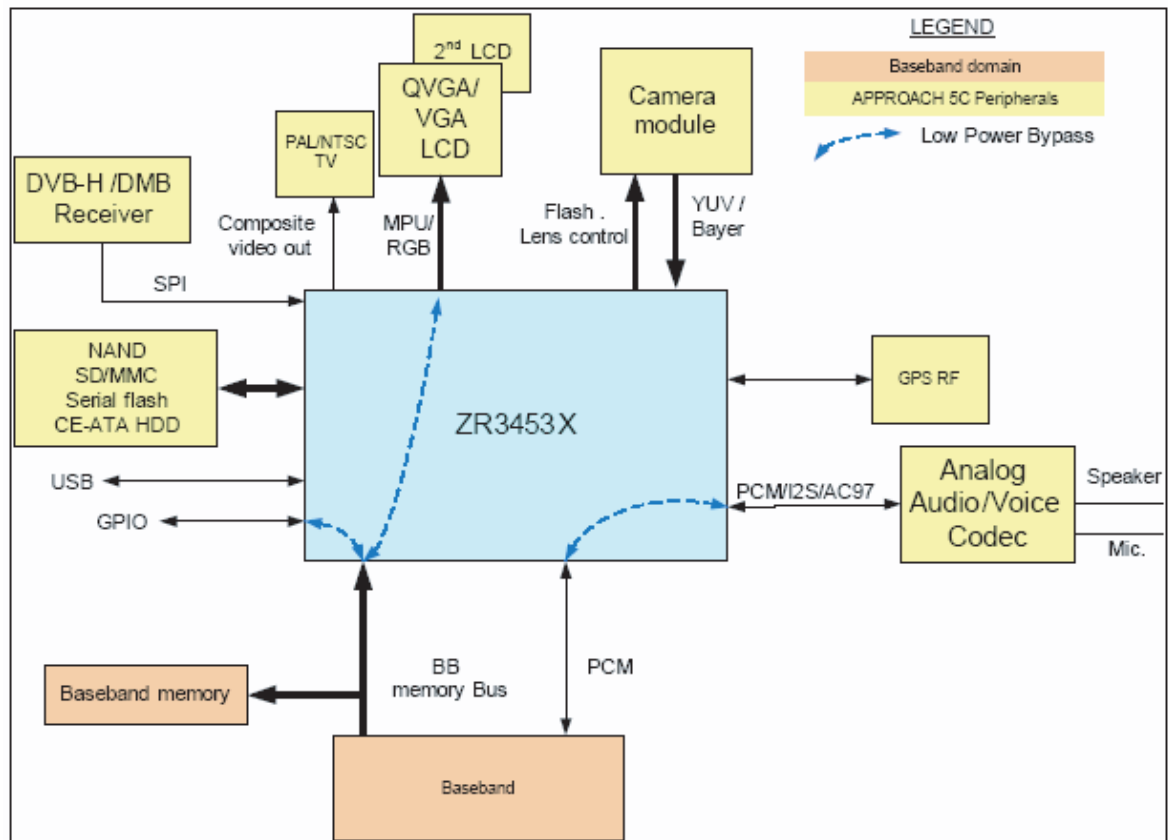
Light sleep mode 500 μ W

- Specifically for GPS accurate off-line tracking

3. TECHNICAL BRIEF

Figure 3.10 presents a typical multimedia cellular phone system where ZR3453X is used as a co-processor. In this system, ZR3453X is connected to the following devices:

- Baseband chip (the host)
- CCD/CMOS Image Sensor for capturing video and still
- LCD panel(s) for displaying video
- Audio CODEC (A2D, D2A) for capturing voice and playing voice/music
- Media Flash (SmartMedia, NANDFlash, MMC or SD) to store media data (two active I/F, e.g. one NAND and one SD)
- Connector to TV



[Figure 3.10]

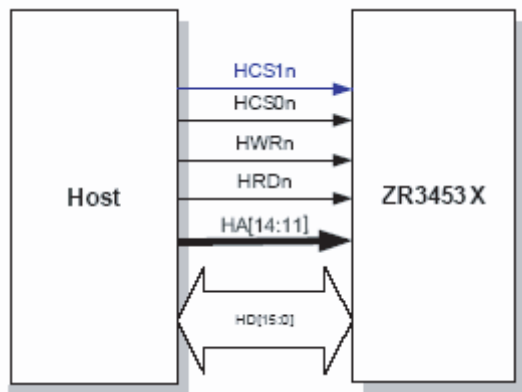
3.11 Multimedia Chip Interface

3.11.1 Host Interface

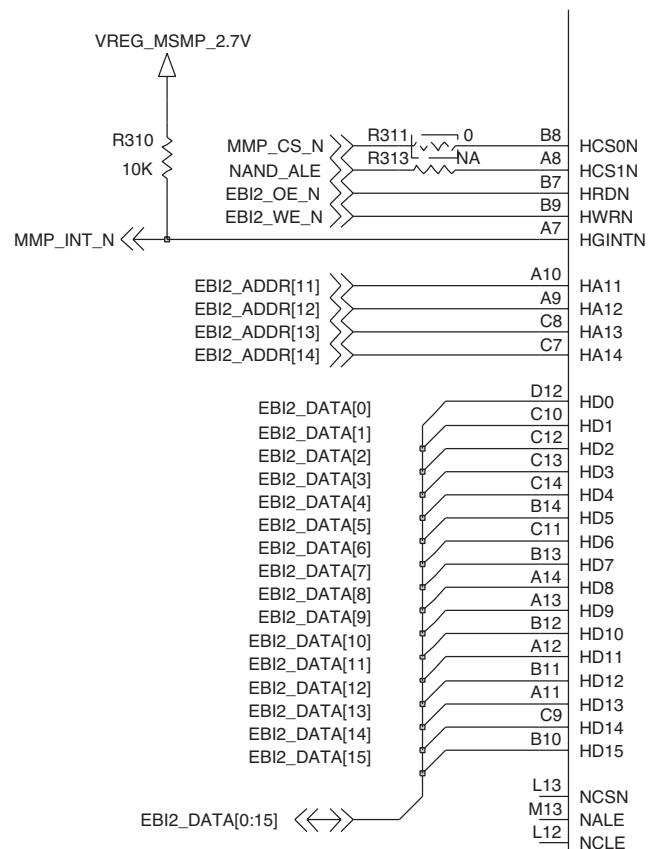
3.11.1.1 Host Interface

The HOST interface connects the ZR3453X and the host processor (a handset baseband chip) in two optional modes:

- On the host memory bus.
- On the host LCD bus.



[Block Diagram]



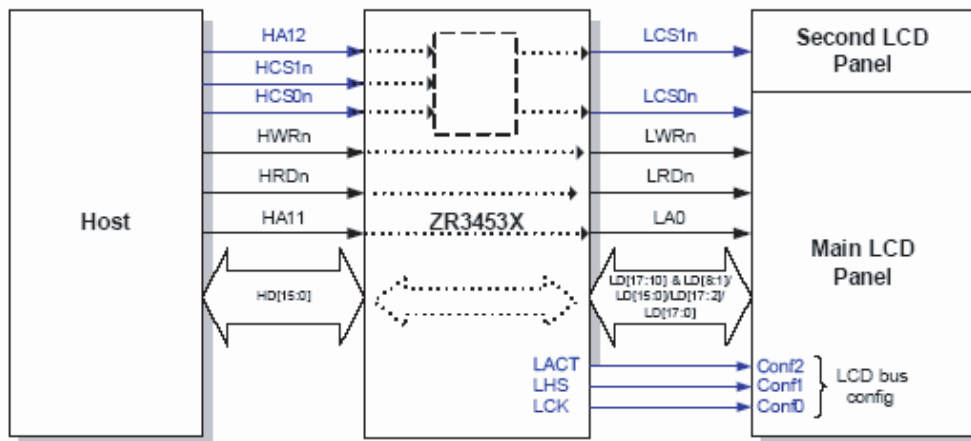
[Schematics]

3. TECHNICAL BRIEF

3.11.2 Host - LCD - Bypass mode

The Host-LCD Bypass bypasses the host interface pins to the LCD pins.

This means that the bus transactions performed by the host are transferred to the LCD pins, enabling the host to have full control over one or two LCD panels, even when the ZR3453X is in sleep mode. This is the default mode.



3.11.3 Camera interface

ZR3453X connects with the CCD or CMOS Image Sensor (CIS) via its image sensor port.

ZR3453X supports several system configurations:

- CCD bayer 10,12,14,16 bit (ZR34532 only)
- CMOS bayer 10,12,14,16 bit
- YCbCr 8 bit
- YCbCr 8 bit with pixel valid
- YCbCr 16 bit

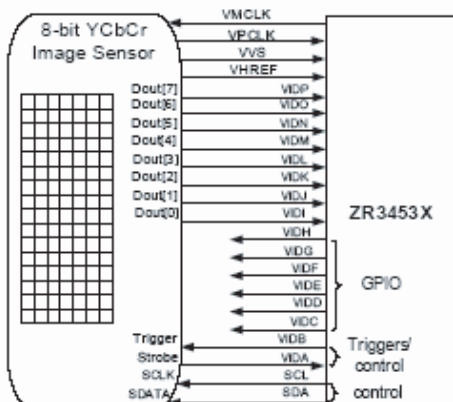
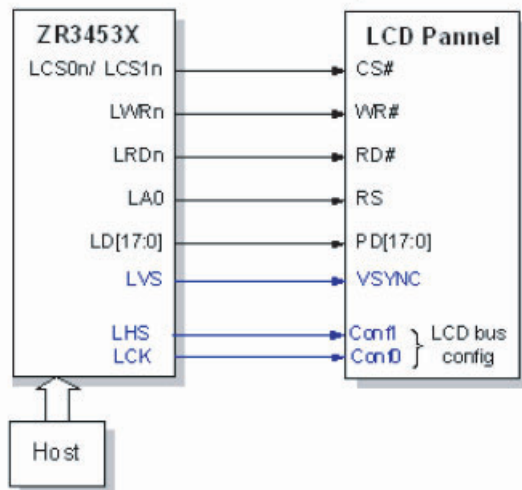


Table 3-11: Input Resolutions for Supported Applications

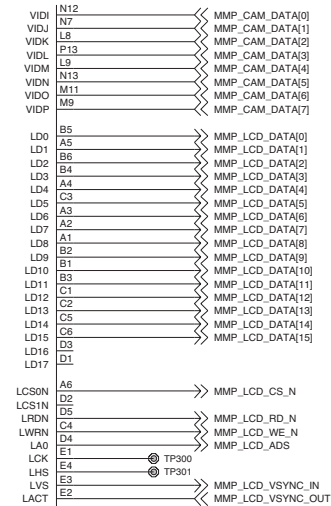
Image sensor resolution	Application
352 x 288 (CIF)	Video / Still
640 x 480 (VGA)	Video / Still
800 x 600 (SVGA)	Video / Still
1024 x 768 (XGA)	Video / Still
1280 x 960 (1.3MP)	Video / Still
1600 x 1200 (2MP)	Still
2048 x 1536 (3MP)	Still
2352 x 1728 (4MP)	Still
2592 x 1944 (5MP)	Still

3.11.4 LCD Interface

The ZR3453X LCD port supports mobile LCD panels of upto VGA size and upto 60fps refresh rate. There are various bus formats and color depth up to 18-bit (262K colors).



[Block Diagram]



[Schematics]

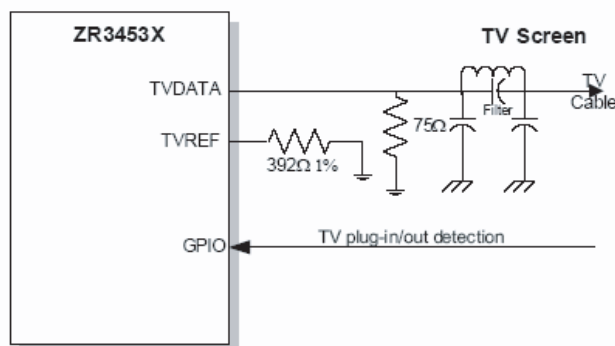
3.11.5 TV out Interface

The display data is converted to video with video-encoder according to CCIR-601 and sampled by 10-bit DAC and transmitted over an analog pad as a composite video signal.

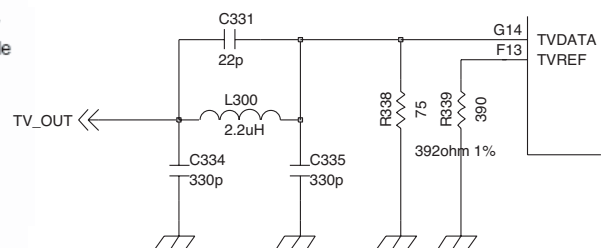
This mode is used in a system where ZR3453X is connected gluelessly to a TV screen that requires real-time display data.

ZR3453X generates TV signal according to the NTSC and PAL standards.

The TVDATA pin can drive a full video level signal directly into a 75 terminated TV cable.



[Block Diagram]



[Schematics]

3. TECHNICAL BRIEF

3.11.6 Audio Interface

In this configuration ZR3453X is connected to an external audio codec.

There are three possible configurations:

- Audio/Voice codec with two ports: PCM and I2S
- Audio/Voice codec with one port: I2S
- Audio/voice/data codec with one port: AC97

In all configurations ZR3453X connects its external audio ports to the codec single or two ports.

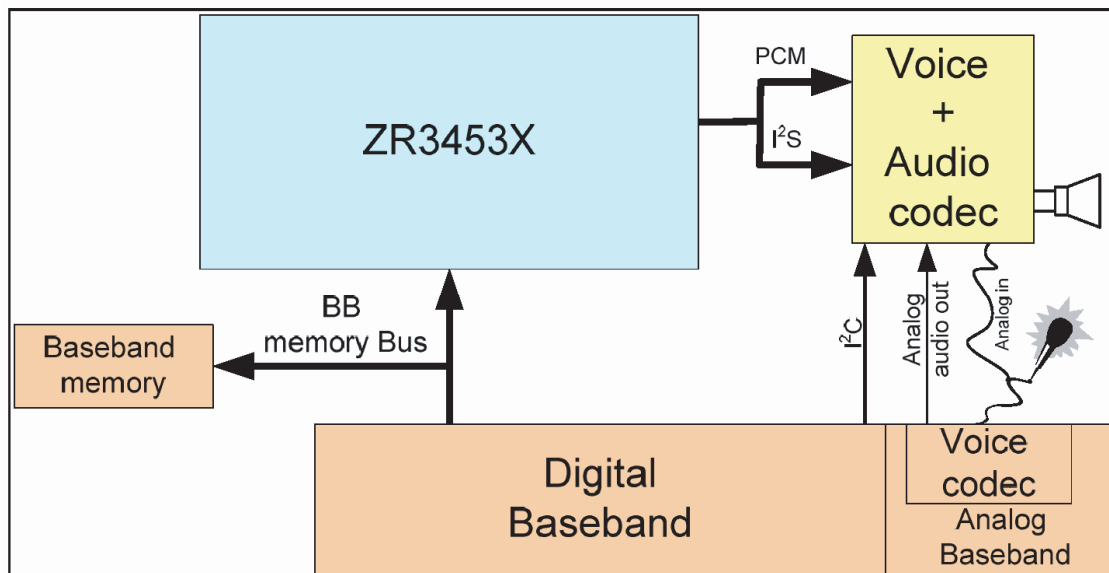
The host uses its internal voice codec for voice communication. There is no bypass of voice.

The host controls the codec configuration via I2C bus directly. The host codec analog audio output is connected to the external audio codec and muxed with the codec audio path from the ZR3453X on the way is to the speaker.

The microphone is connected to the external audio codec and the baseband internal codec.

ZR3453X appears in Figure 3.11 as a master on the bit clock and frame sync. This is only one of the possible configurations.

In external audio configuration ZR3453X can run all the Audio/voice applications including conversation recording .



[Figure 3.11]

ZR3453X is a USB 2.0 Device or On-the-Go dual-role device (OTG) with the following characteristics:

3. TECHNICAL BRIEF

ZR3453X has a dedicated port for multimedia cards. It can support SD (Secure Digital) cards and SecureMMC (standard multimedia cards with security functions).

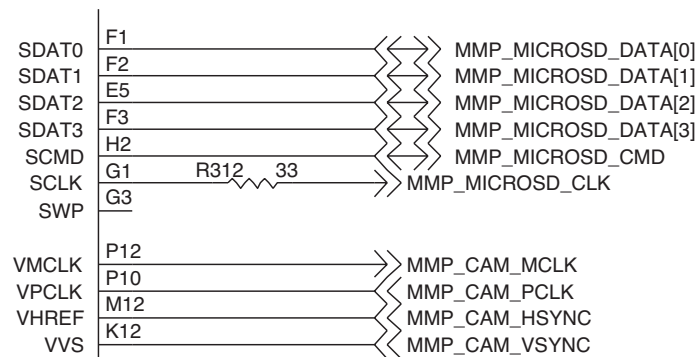
The same port can be used for HDD CE_ATA connection or SDIO to peripheral devices (e.g.; MDTV front-end).

MMC

- MMC v4
- Dual voltage (separate IO power domain, host GPIO control)
- 1 or 4 bit cards
- Multiple cards support (if dual-voltage or high-speed interface are not used)
- Up to 43 MHz bit clock

SD

- 1 or 4 bit bus support
- High-Speed SD, up to 43 MHz bit clock

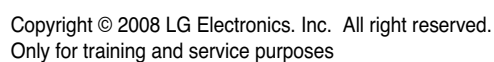


3.11.9 Power Domain

Symbol	Parameter	Min.	Typ.	Max.	Units
V _{DDIO}	I/O supply voltage (VDD_Host, VDD_PMU vs. GND)	1.62	1.8-3.3	3.6	V
V _{DDIO}	I/O supply voltage (VDD_General, VDD_Serial, VDD_MMC, VDD_LCD, VDD_NAND, VDD_CIS vs. GND)	1.62 ¹	1.8-3.3	3.6	V
V _{SDRAM}	SDRAM interface pins (VDDQ, VDD_SD_Core vs. GND)	1.7	1.8	1.95	V
V _{DDCORE}	Core supply voltage (VDDCore vs. GND)	0.97	1	1.1	V
V _{DPLL}	PLL digital supply (AVDD_PLL vs. AVSS_PLL)	0.97	1	1.1	V
V _{APLL}	PLL analog supply (AHVDD_PLL vs. AHVSS_PLL)	0.97	1	1.1	V
V _{TVOUT}	TVOUT analog supply (AVDD_VDAC, AVDD_VDAC_I vs. AGND_VDAC_BS, AGND_VDAC_P)	2.7	3.3	3.6	V
V _{USB}	USB power supply (VDD_USB vs. GND_USB)	3.0	3.3	3.6	
T _A	Ambient temperature	-40	25	85	°C

The TSC2007 device has a 12-bit analog-to-digital resistive touch screen converter including drivers and the control logic to measure touch pressure. The TSC2007 device is controlled by I2C port from ESM6270.

And, there control signals are followed



3. TECHNICAL BRIEF

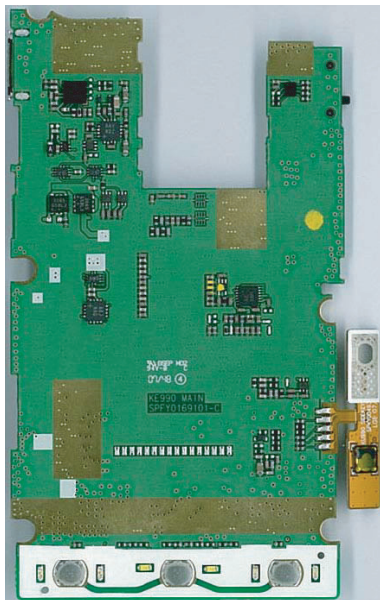
3.13 Main Features

3.13.1 Main features of KE990

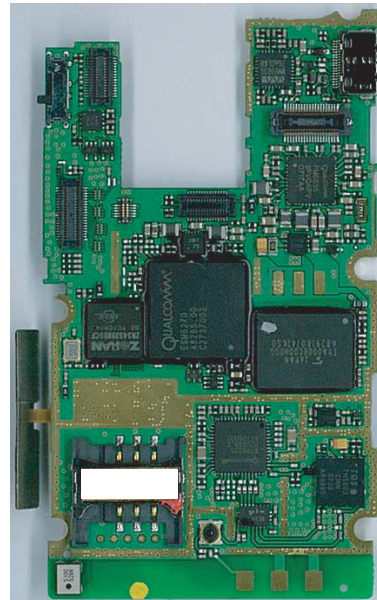
- BAR Type
- GSM(850,1800) + PCS(1900) Triple mode
- Main LCD: 240x400/3.0"/262K TFT
- 5.0M Pixel AF Camera
- Ø16 module speaker
- Stereo Headset
- Loud Speaker phone
- 64 Poly Sound
- Audio: MP3, AAC, AAC+,AAC++, WMA, WAV
- MPEG4 encoder/decoder and play/save
- H.263 decoder
- Video Recording: VGA 30 fps
- JPEG en/decoder
- Support Bluetooth, USB
- FM Radio
- touch screen, touch feedback
- 103.5 x 54.4 x 14.8 mm
- 1000mAh soft pack

3.14 Main Component

3.14.1 Main Components of KE990



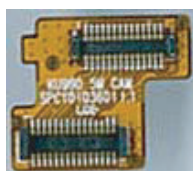
MAIN Top Side



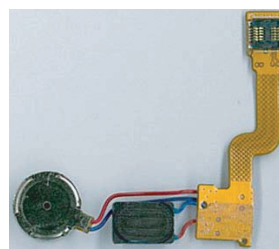
MAIN Bottom Side



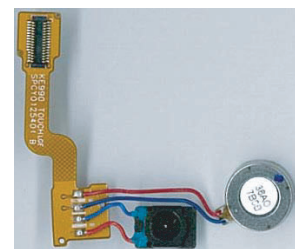
5M camera



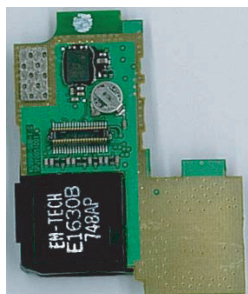
5M Camera FPCB



Touch FPCB Bottom



Touch FPCB Top



Sub Top Side



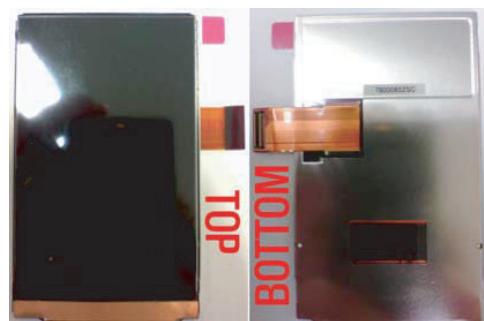
Sub Bottom Side



Antenna



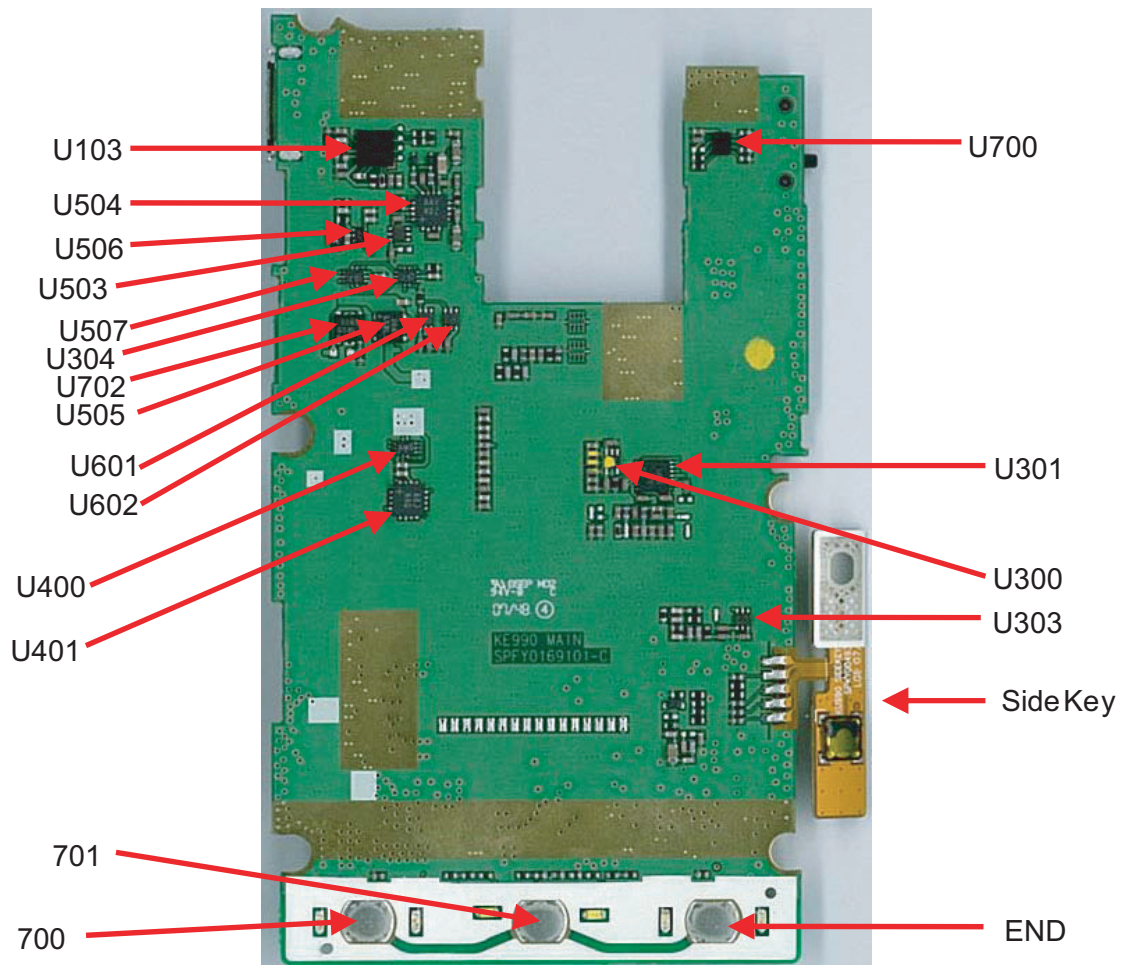
Strobe Flash



LCD

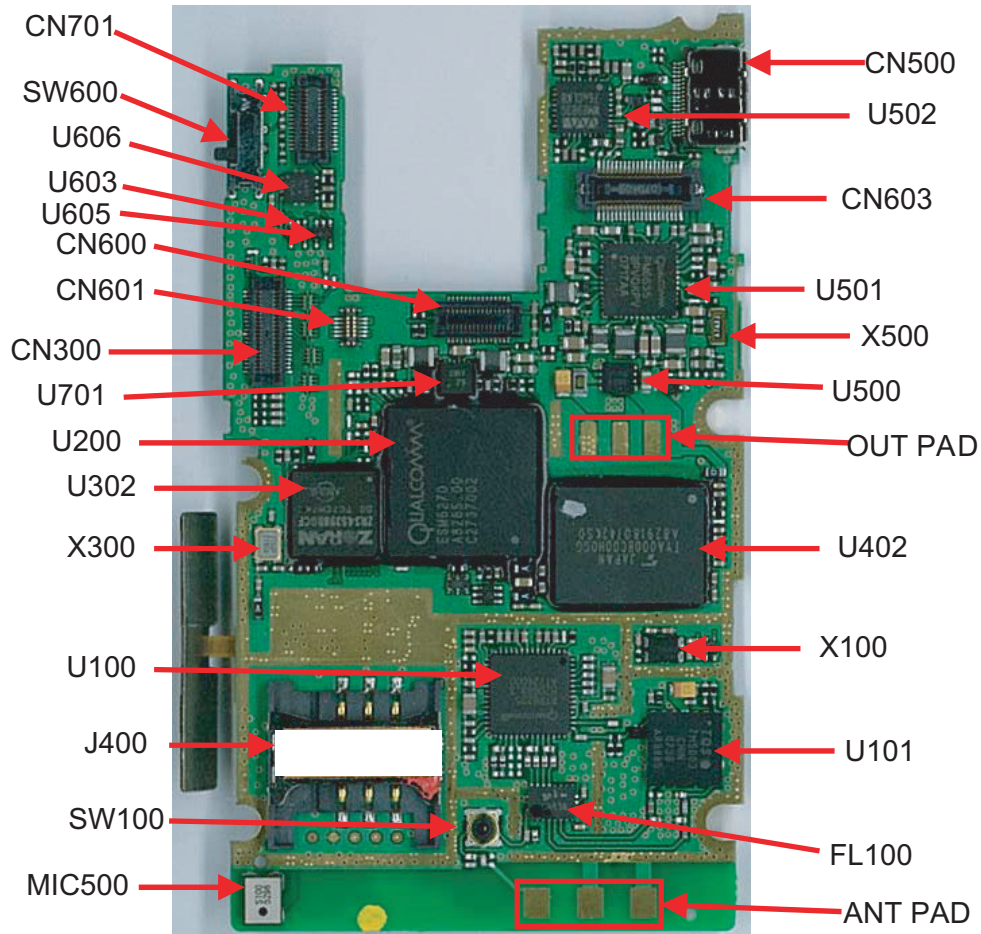
3. TECHNICAL BRIEF

3.14.1.1 Main Top Side



Reference	Description	Reference	Description
U103	FM Radio IC	700	Send Key
U504	Headphone AMP IC	701	Clear Key
U506	CAM/HP MIC SEL IC	END	End Key
U503	Audio AMP LDO	SideKey	Side Key FPCB
U507	USB/REMOCON SEL IC	U303	LCD LDO IC
U304	Switch IC for USB2.0	U300	
U505	Over Voltage Protection IC	U301	LCD Backlight Charge Pump IC
U702		U700	Touch Screen Driver IC
U601	5M CAM LDO IC	U400	MicroSD Select ESM and MMP IC
U602		U401	

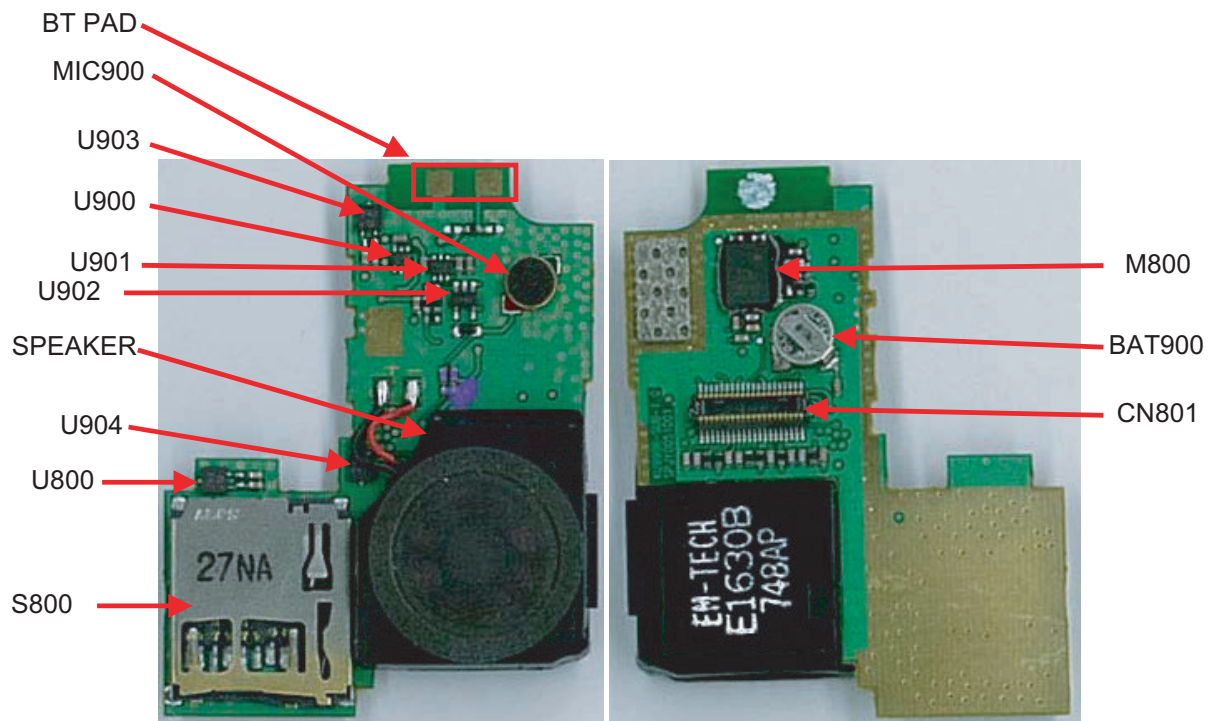
3.14.1.2 Main Bottom Side



Reference	Description	Reference	Description
CN701	Touch FPCB Connector	CN500	TA and USB Connector
SW600	Mode Switch	U502	WM8983 Audio DAC/ADC AMP IC
U606	Linear Motor Driver IC	CN603	Main-Sub B-to-B Connector
U603	Linear Motor Control IC	U501	PM6635 PMIC
U605		X500	32.768KHz Crystal Oscillator
CN600	5M CAM FPCB Connector	U500	Charging IC
CN601	Strobe Flash Connector	OUT PAD	Battery Connector PAD
CN300	LCD Connector	U402	Memory IC
U701	DC-DC Converter IC	X100	19.2MHz Crystal Oscillator for TCXO
U200	ESM6270 Modem IC	U101	PAM IC for GSM
U302	ZR3453 DSP IC	FL100	Antenna Switching Module
X300	27Mhz Crystal Oscillator	ANT PAD	Main Intenna Connection PAD
U100	RTR6235 RF IC	SW100	RF Switch
J400	SIM Connector	MIC500	MIC

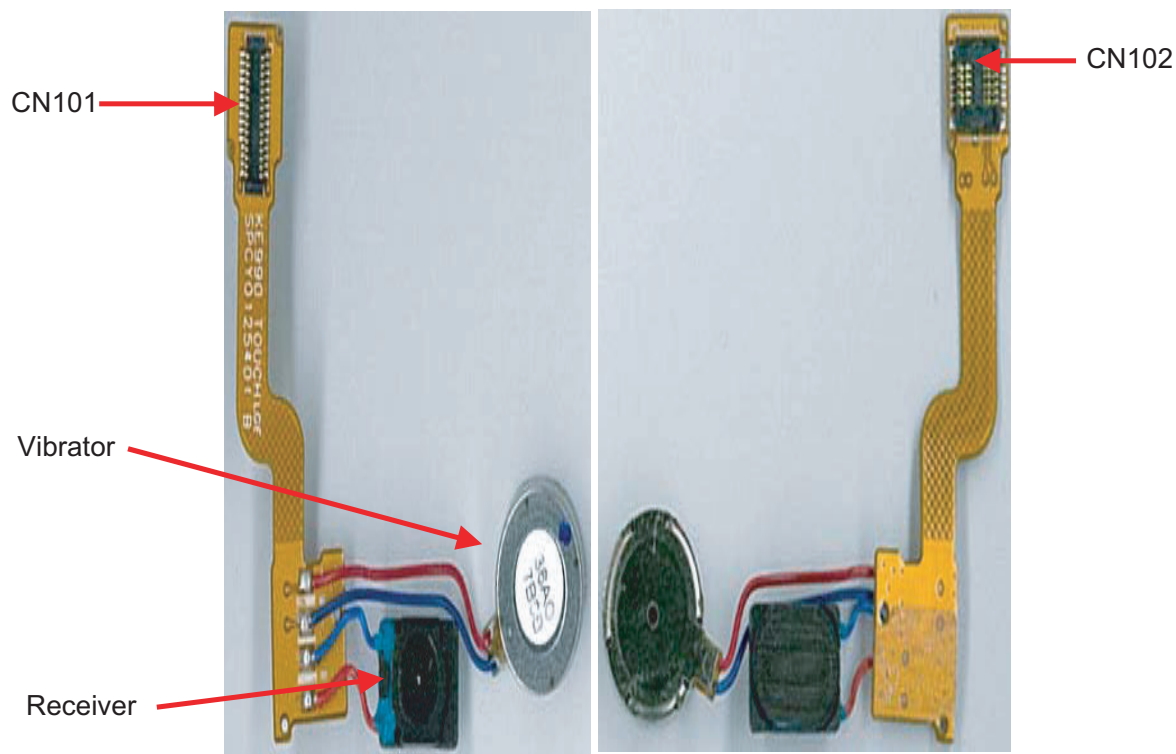
3. TECHNICAL BRIEF

3.14.1.3 Sub PCB



Reference	Description	Reference	Description
BT PAD	Bluetooth Antenna PAD	SPEAKER	Module Speaker
MIC900	CAM MIC	S800	T-Flash Connector
U900	5MP Camera Power IC	U903	Hall IC for Wheel Switch Detection
U901		U904	
U800	Hall IC for Camera Cover Detection	CN801	Main-Sub B-to-B Connector
M800	Bluetooth Driver IC	BAT900	Backup Battery
U902	Headset Hook Switch IC		

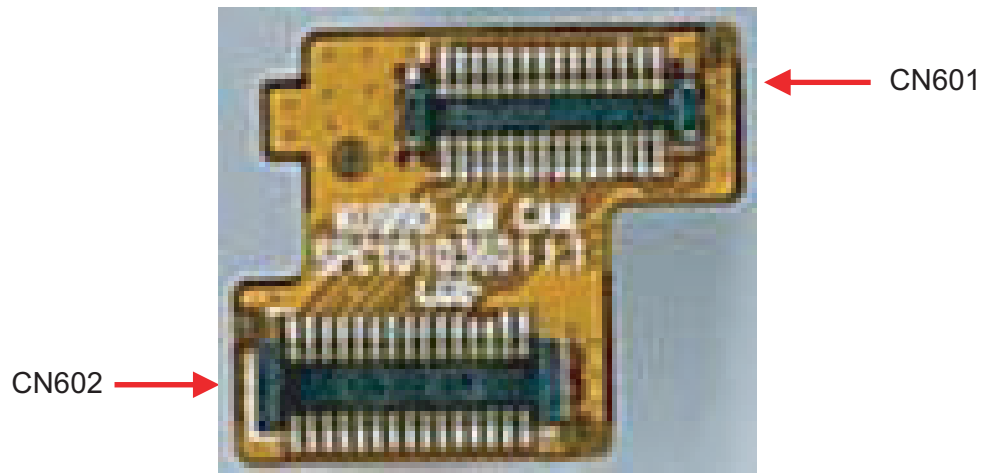
3.14.1.4 Touch FPCB



Reference	Description	Reference	Description
Vibrator	Vibrator PAD	CN101	Main B-to-B Connector (FPCB to Main PCB)
Receiver	Receiver PAD		
CN102	Touch Window Connector		

3. TECHNICAL BRIEF

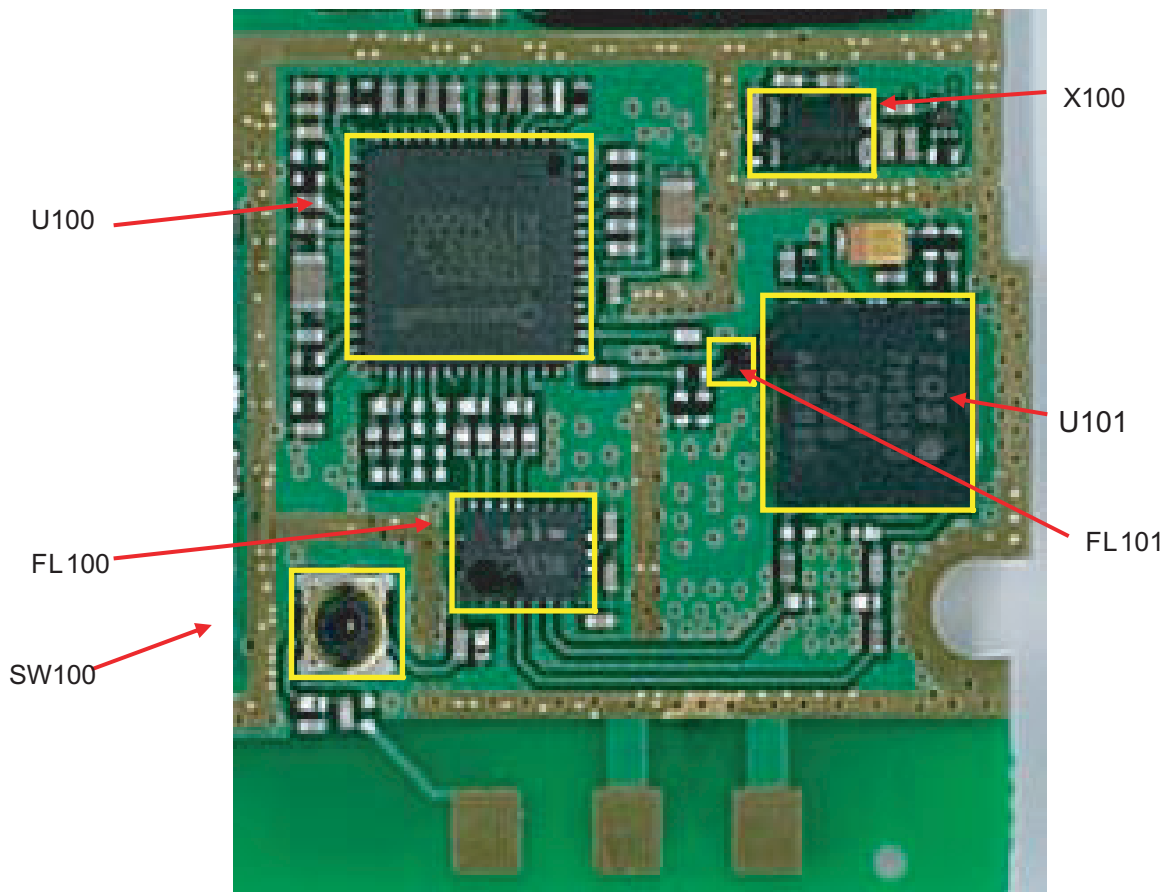
3.14.1.5 5M Camera FPCB



Reference	Description	Reference	Description
CN601	5M Camera Module Connector	CN602	Main PCB Connector (FPCB to Main PCB)

4. TROUBLE SHOOTING

4.1 RF Component

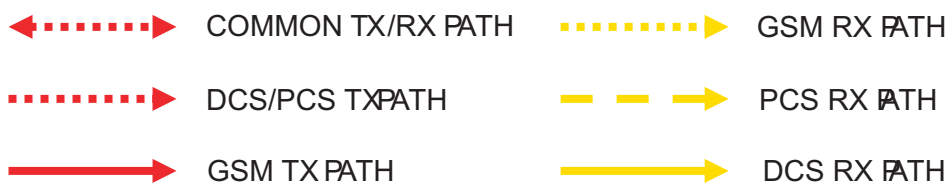
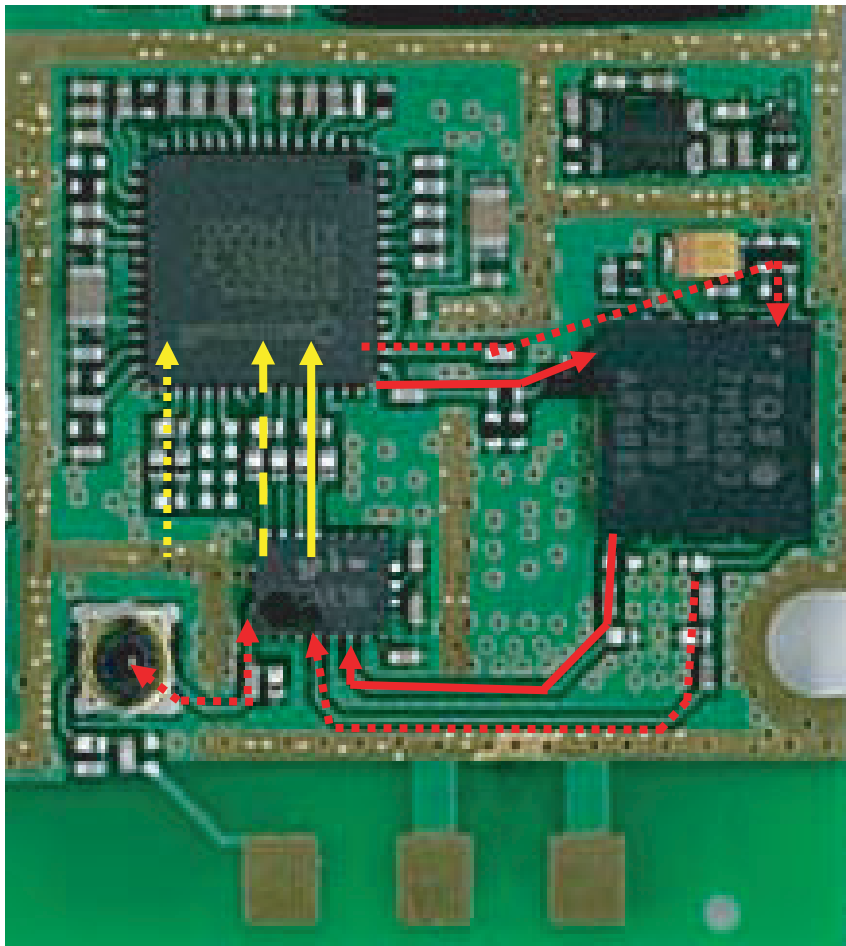


Reference	Description	Reference	Description
U100	GSM Transceiver (RTR)	X100	VCTCXO(19.2MHz)
FL100	Front-End-Module	U101	GSM/EDGE PAM
SW100	RF Antenna Connector	FL101	GSM900 TX SAW

4. TROUBLE SHOOTING

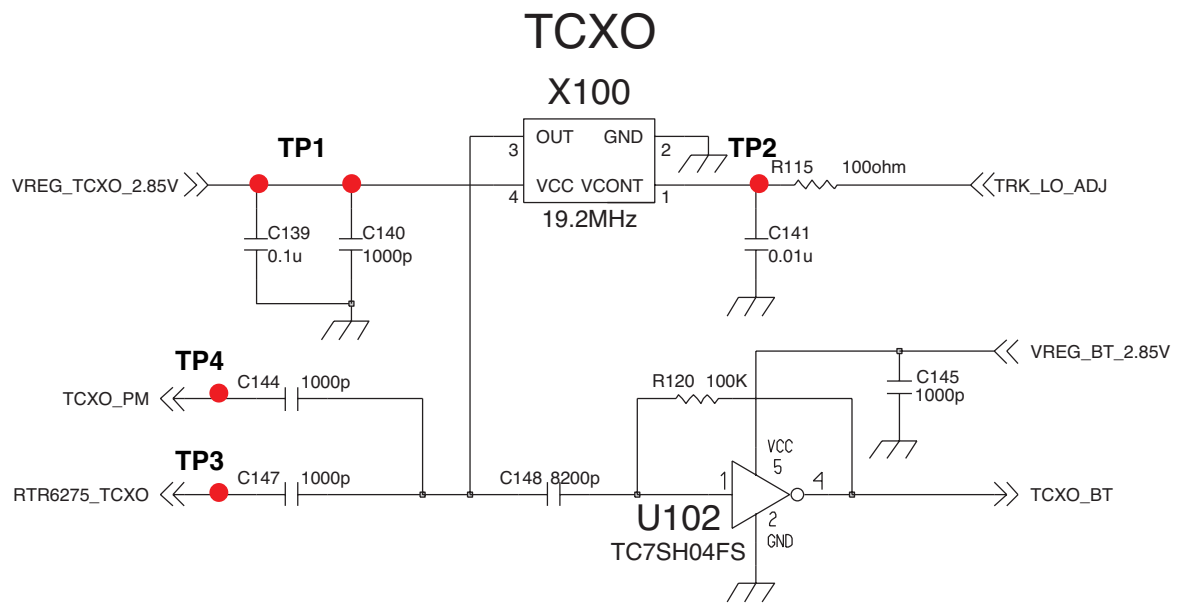
4.2 Main Component

4.2.1 GSM PATH

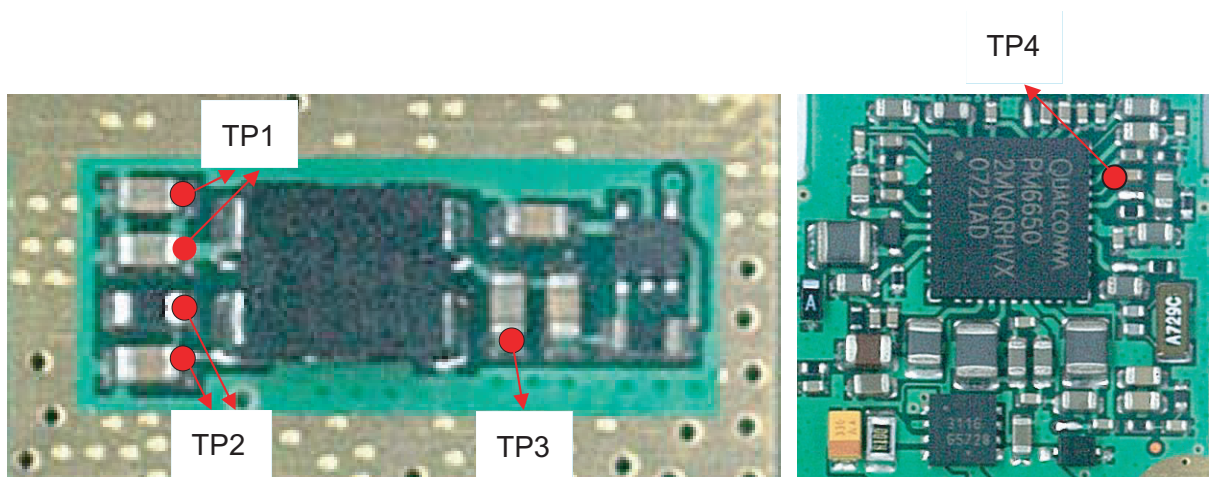


4.3 Checking VCTCXO Block

The reference frequency (19.2MHz) from X100 (VCXO) is used UMTS TX part, GSM part and BB part.

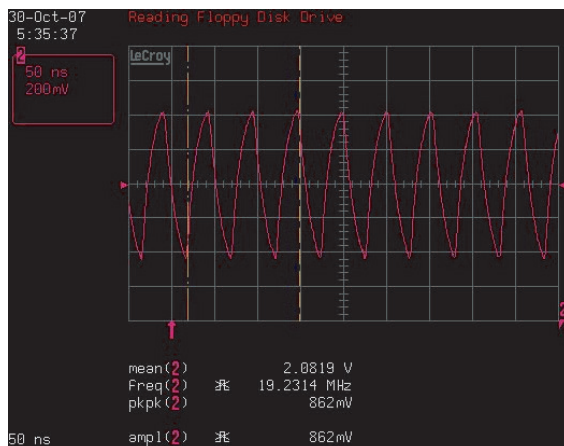
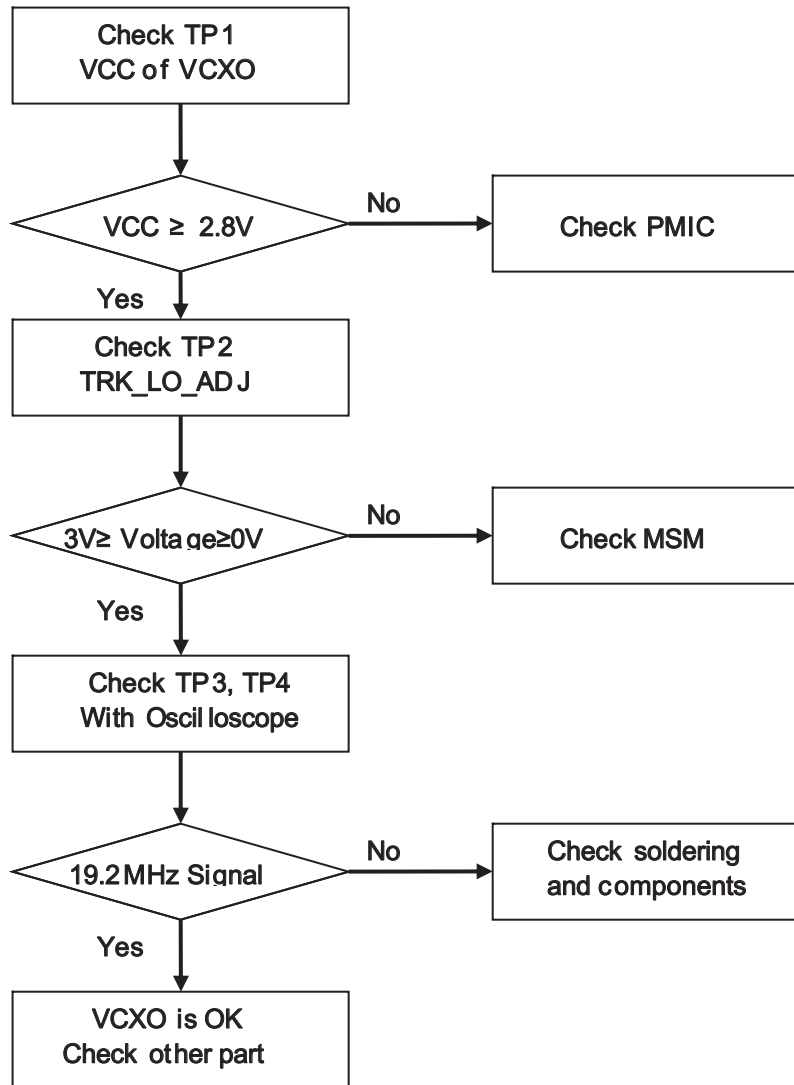


Schematic of the TCXO Block



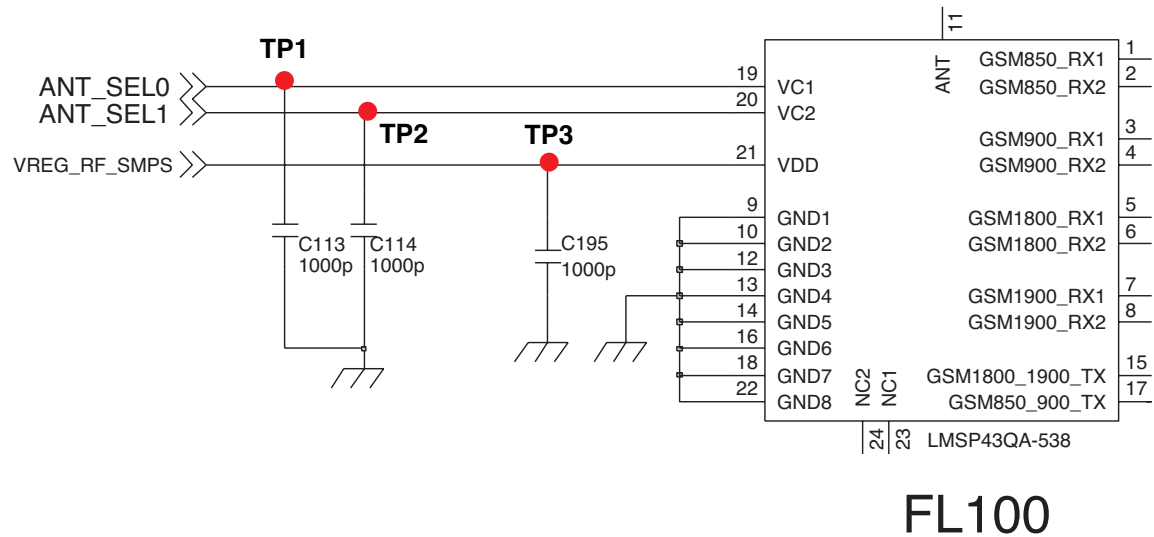
Test Point of the TCXO Block

4. TROUBLE SHOOTING

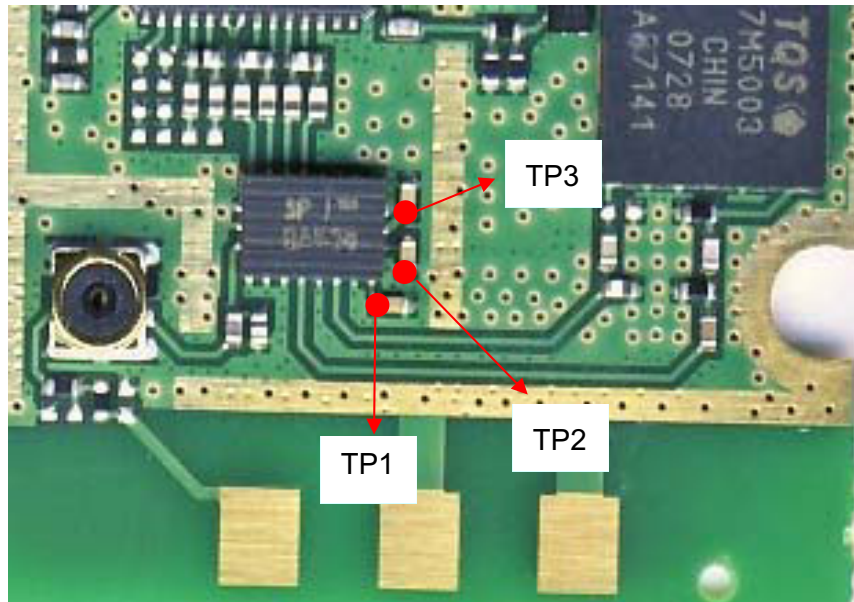


TCXO output waveform(19.2MHz)

4.4 Checking Front-End Module Block



Schematic of the Front-End Module Block



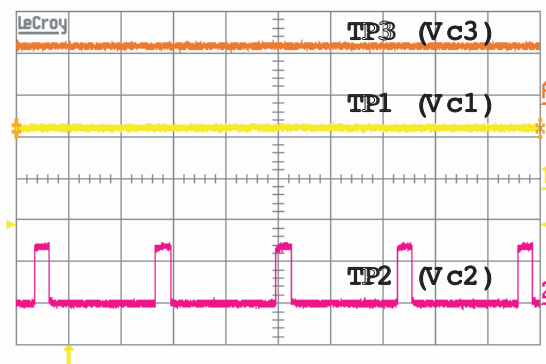
Test Point of Front-End Module Block

4. TROUBLE SHOOTING

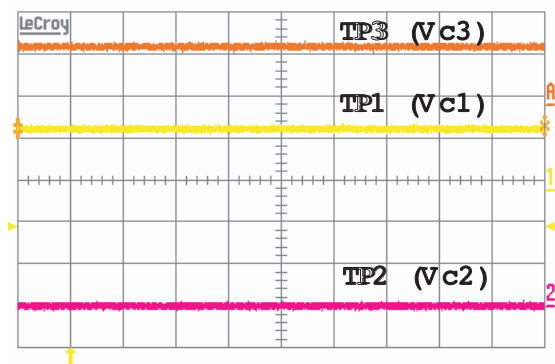
Control Logic (L : 0 ~ 0.1V, H : 2.4 ~ 2.8V)

Mode	Vc1	Vc2	Vdd
GSM900 Tx	H	H	H
DCS1800/PCS1900 Tx	L	H	H
GSM900 Rx	H	L	H
DCS1800 Rx	L	L	H
PCS1900 Rx	L	L	H

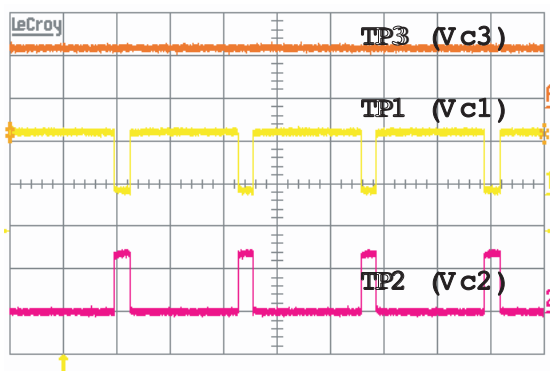
Logic Table of the FEM



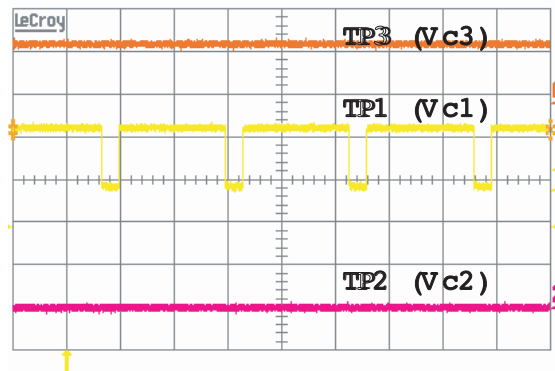
GSM900 Tx



GSM900 Rx



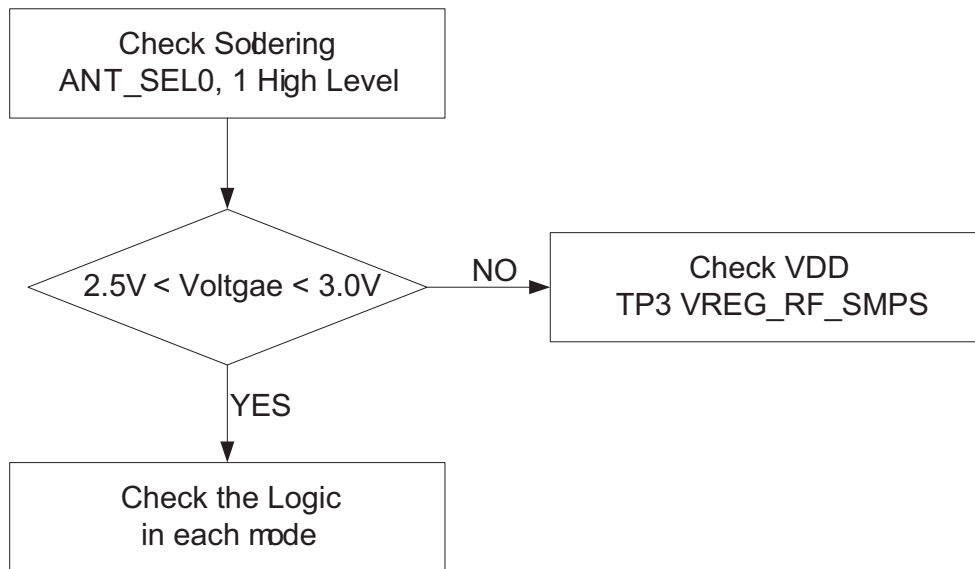
DCS1800/PCS1900 Tx



DCS1800 / PCS1900 Rx

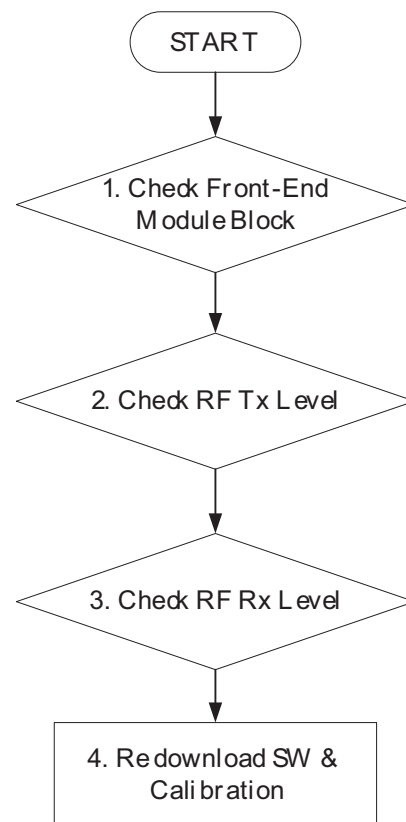
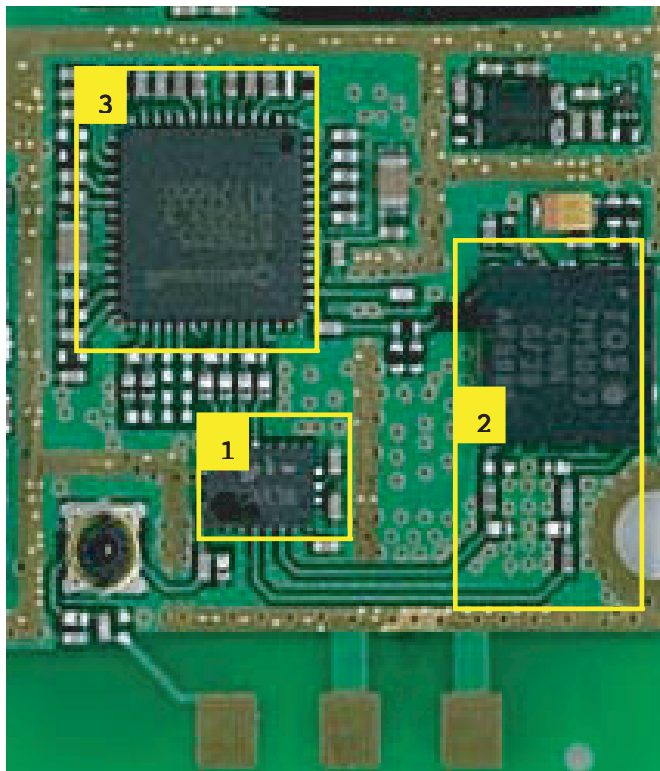
4. TROUBLE SHOOTING

Checking Switch Block power source



4. TROUBLE SHOOTING

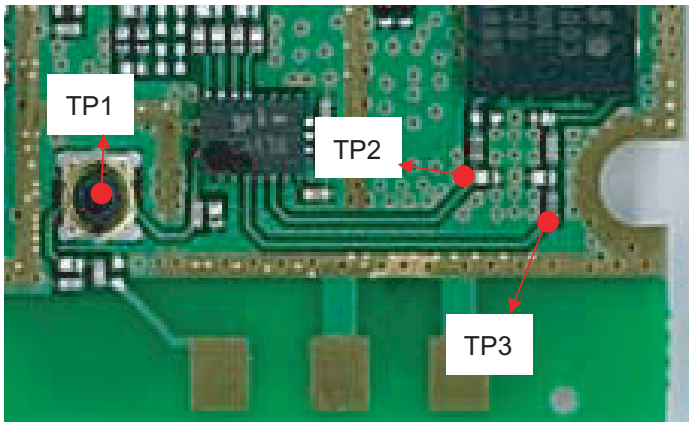
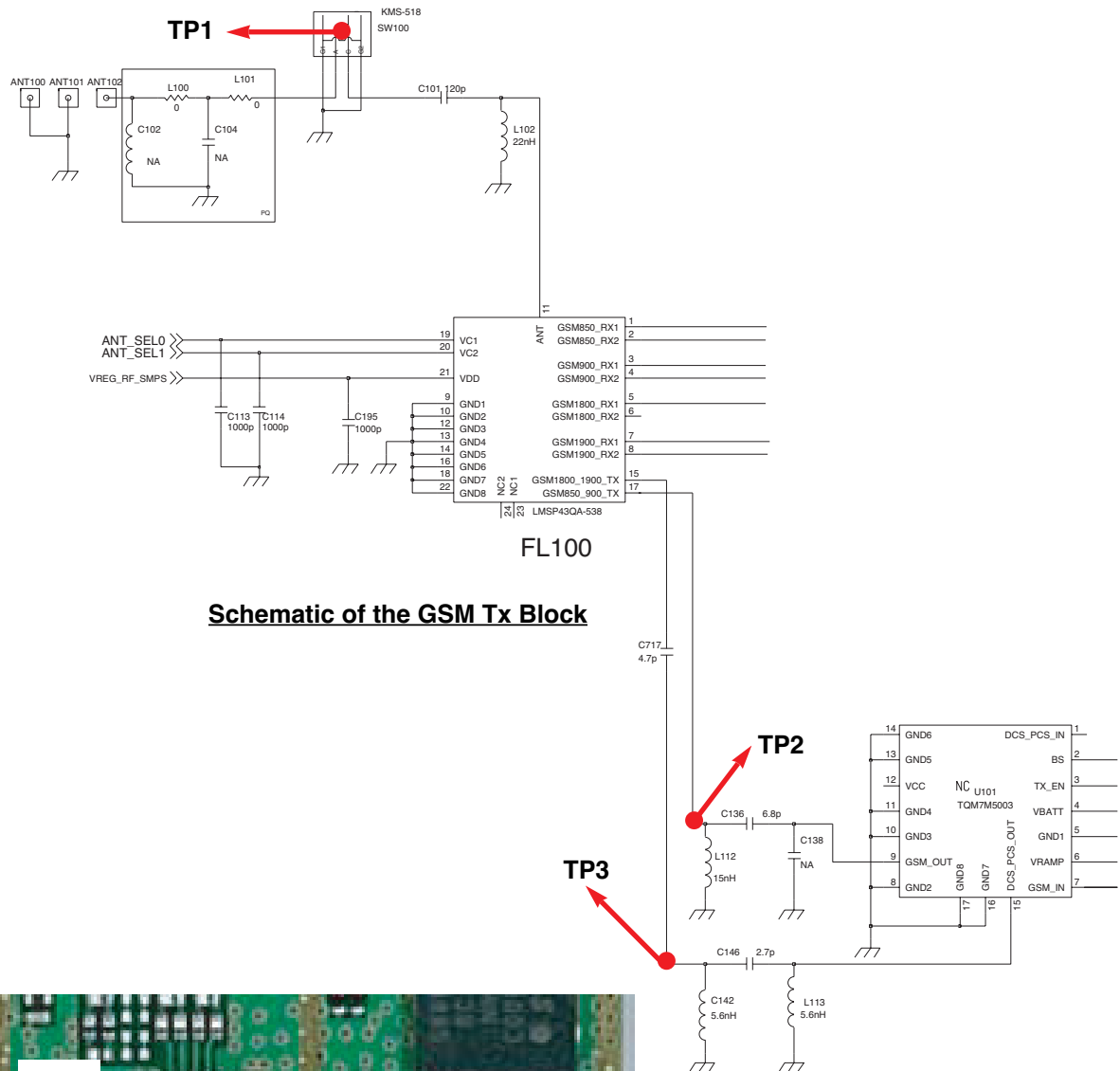
4.5 Checking GSM Block



4.5.1 Checking Front-End Module

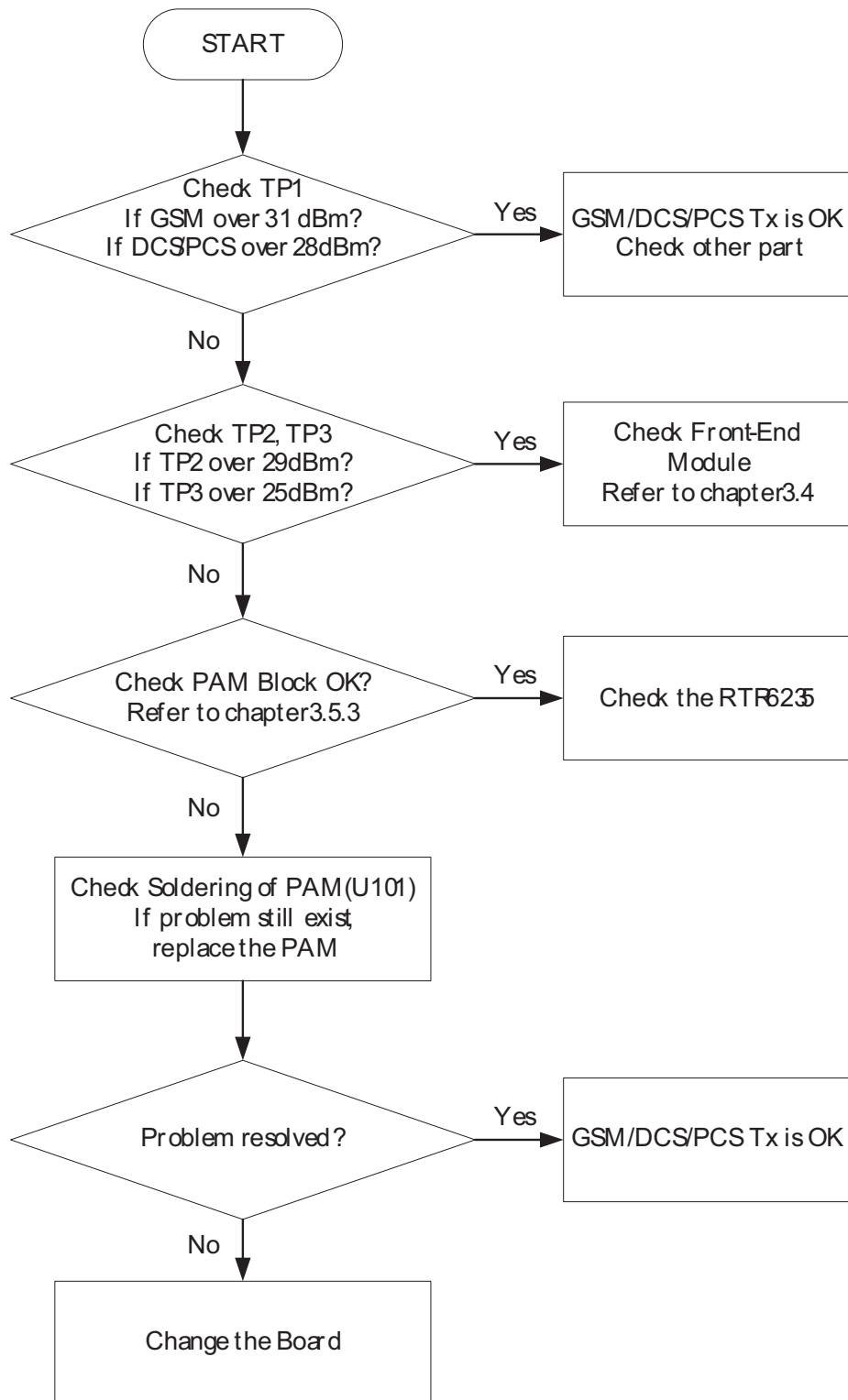
Refer to chapter 3.4

4.5.2 Checking RF Tx Level



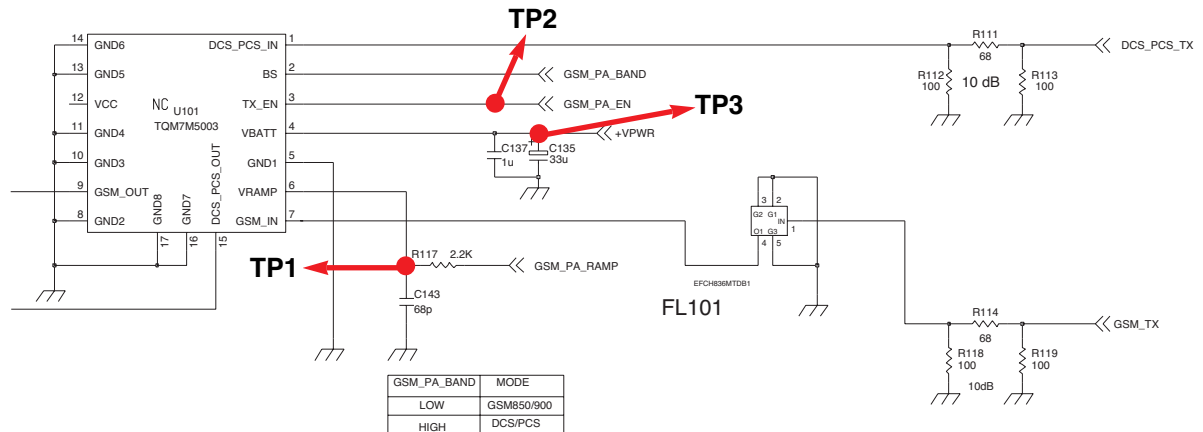
Test Point of GSM Tx Block

4. TROUBLE SHOOTING

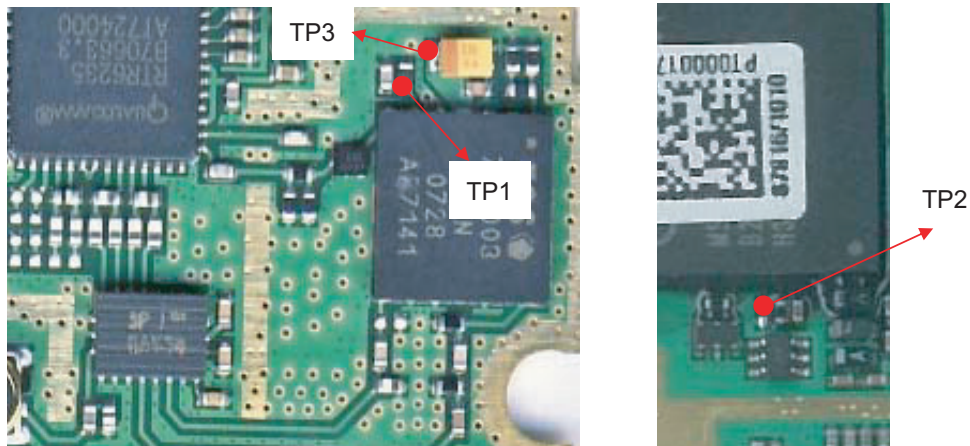


4. TROUBLE SHOOTING

4.5.3 Checking PAM Block



Schematic of PAM Block

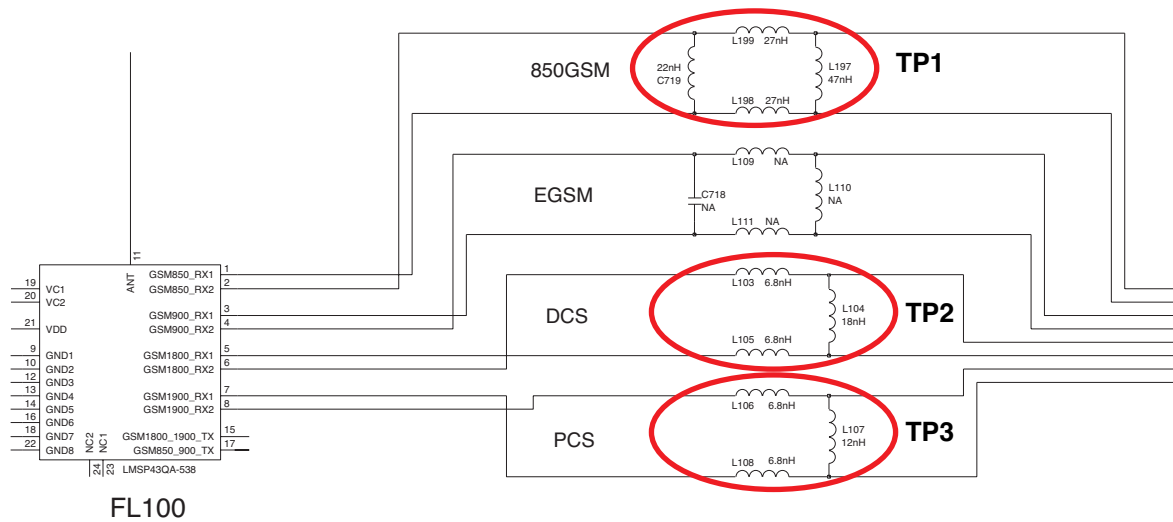


Test Point of PAM Block

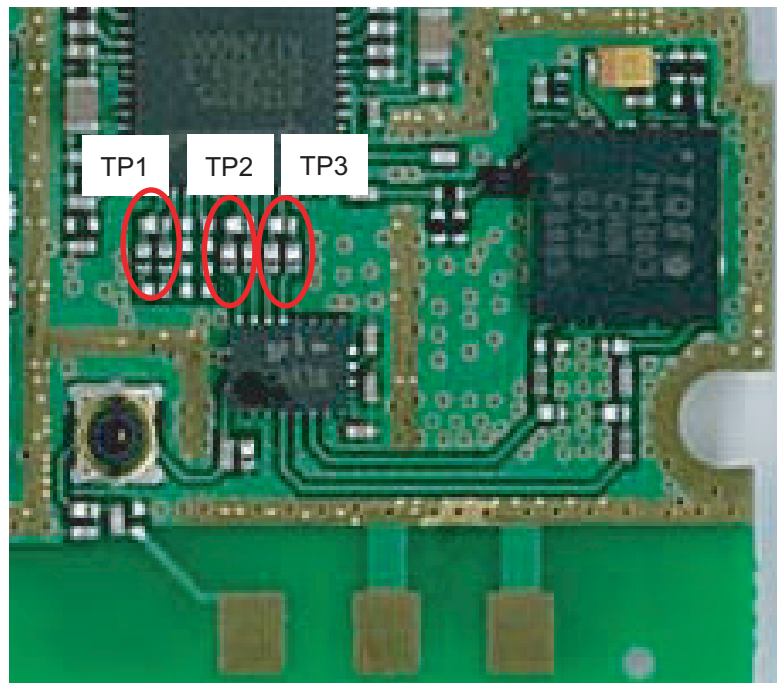
Test Point	Net name	Description
TP1	GSM_PA_RAMP	Power Amp Gain Control. Typically, 0.2 ~1.6V
TP2	GSM_PA_EN	Power Amp Enable (ON : >2.5V, OFF : <0.7V)
TP3	+VPWR	PAM Supply Voltage (Vcc > 3V)

4. TROUBLE SHOOTING

4.5.4 Checking RF Rx Level

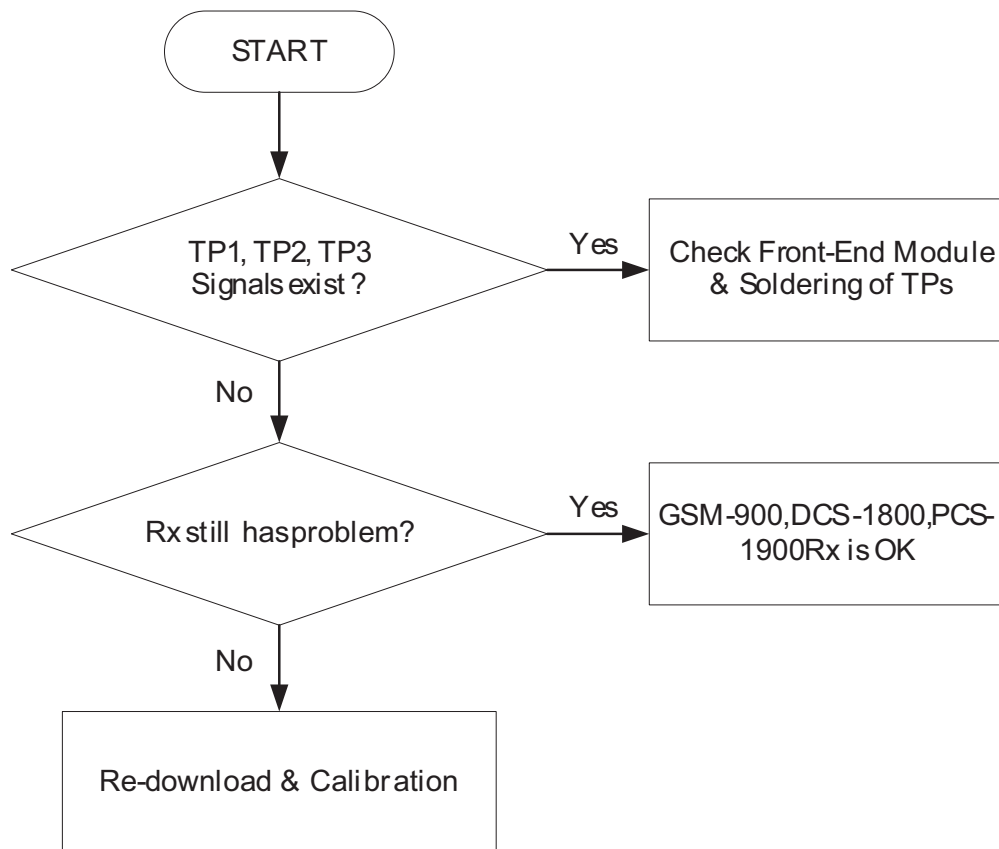


Schematic of GSM-900, DCS-1800, PCS-1900 Rx Block



Test Point of Rx Block

4. TROUBLE SHOOTING

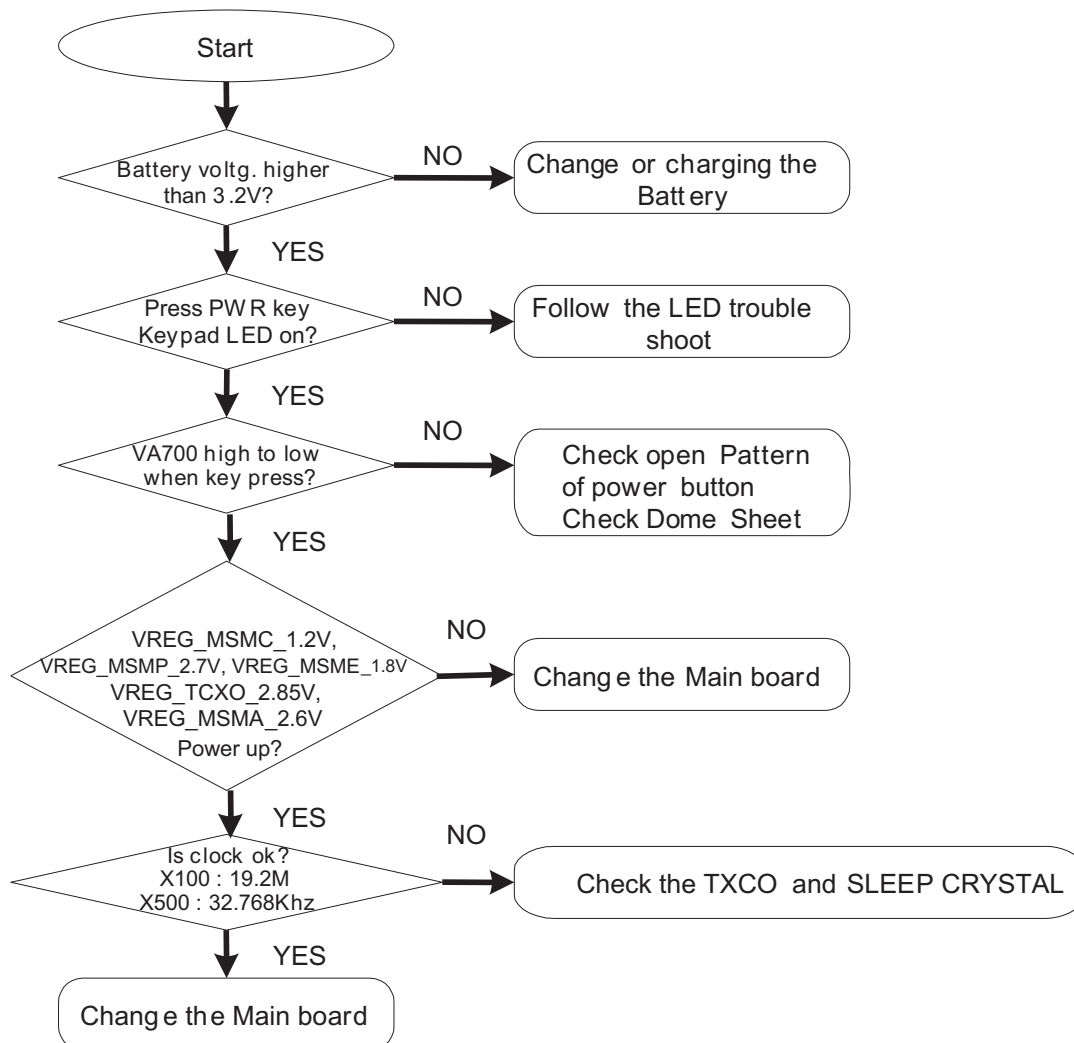


4. TROUBLE SHOOTING

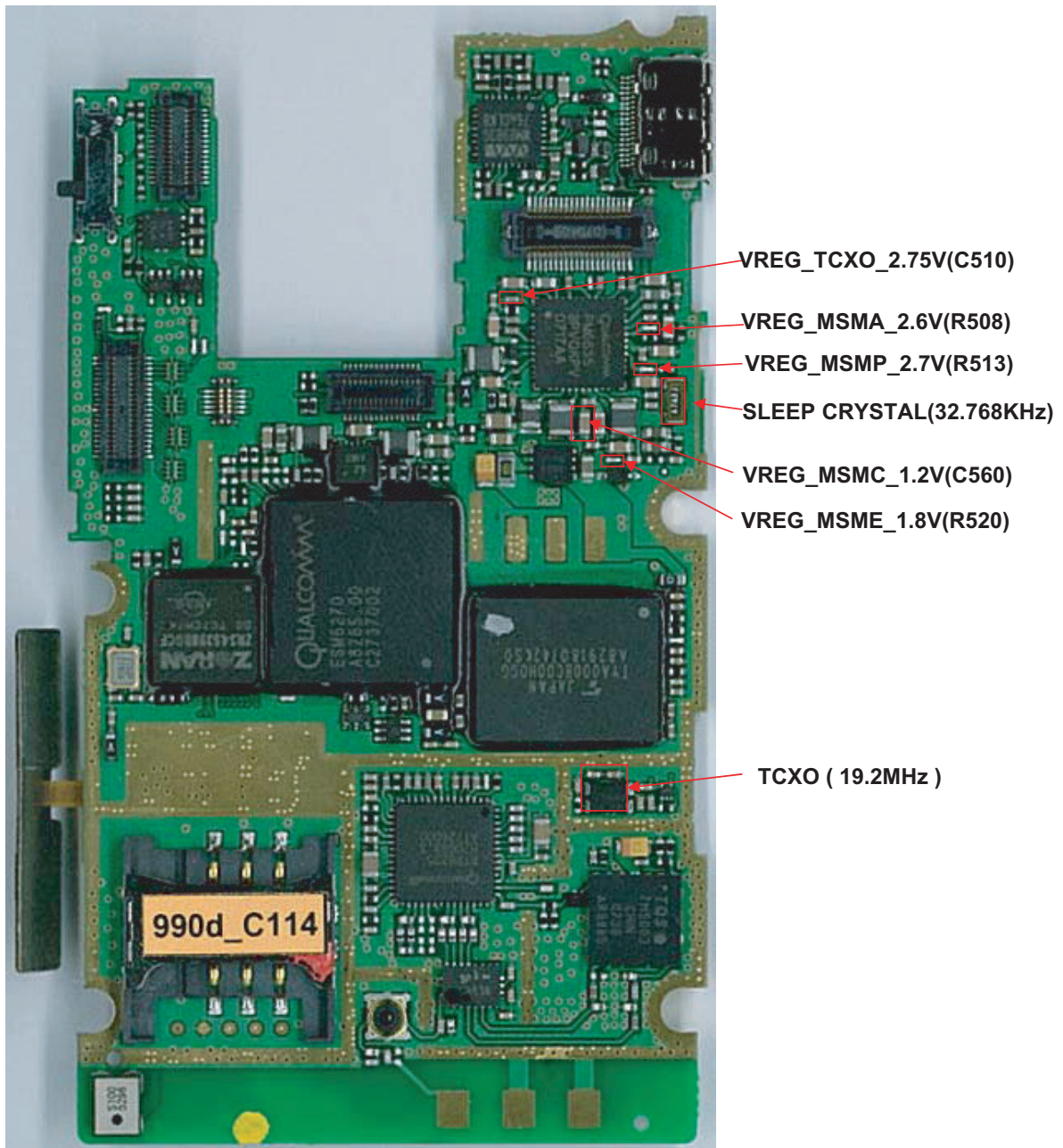
4.6 Power on trouble

Power on sequence of KE990 is :

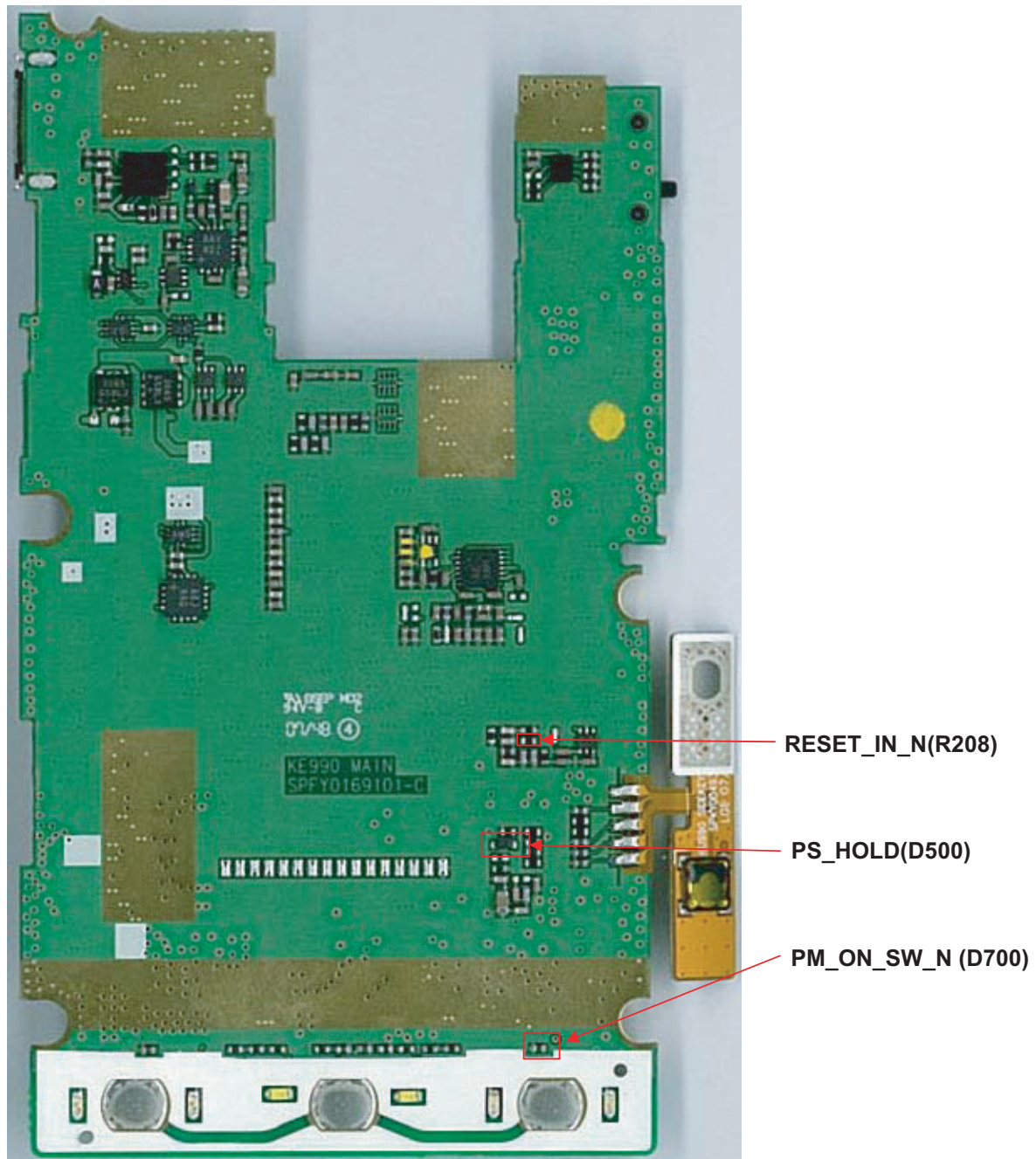
PWR key press → PM_ON_SW_N go to low (VA700, PM6635-2M KPDPWR_N pin#24) → PM6635-2M Power Up → VREG_MSMC_1.2V(C560), VREG_MSME_1.8V(R520), VREG_MSMP_2.7V(R513), VREG_MSMA_2.6V(R508), VREG_TCXO_2.85V(C510) power up → PON_RESET_N assert to MSM → Phone booting & PS_HOLD(D500) assert High to PMIC(PM6635-2M)



4. TROUBLE SHOOTING



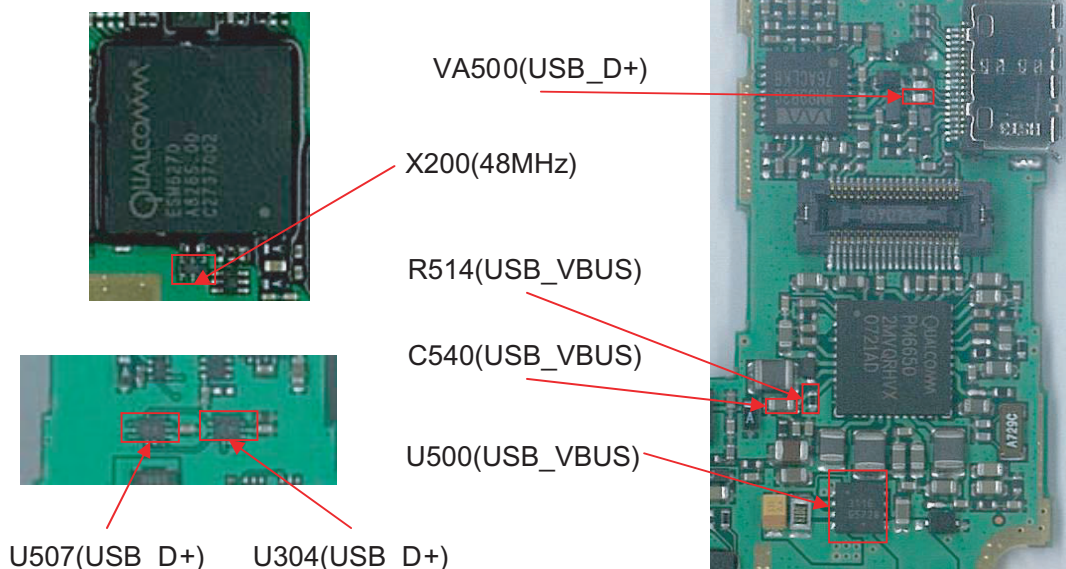
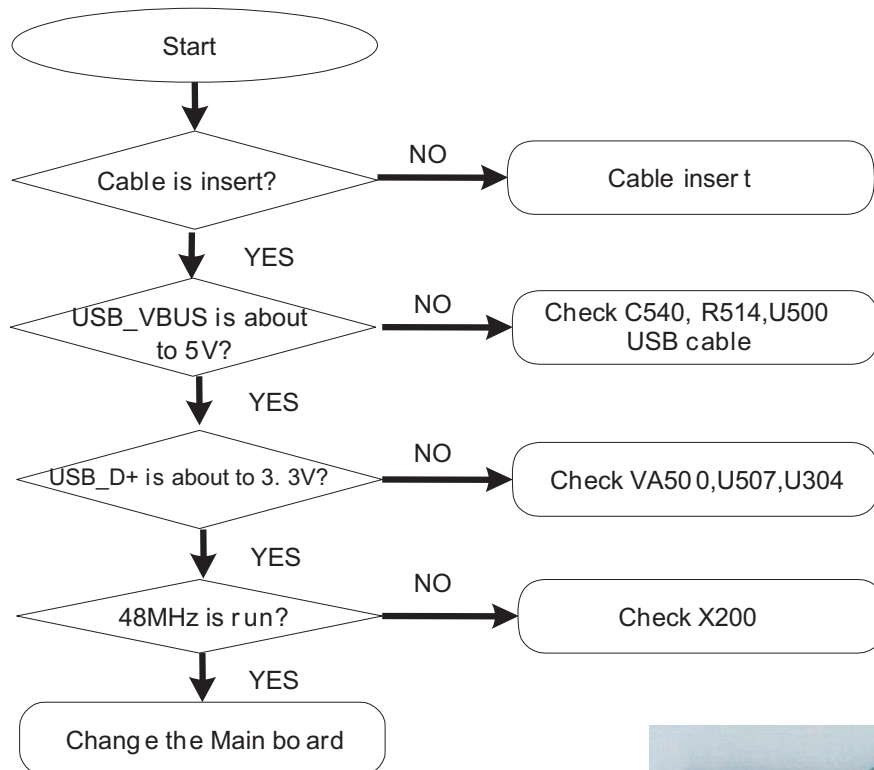
4. TROUBLE SHOOTING



4.6.1 USB trouble

USB Initial sequence of KE990 is :

USB connected to KE990 → USB_VBUS(C540) go to 5V → USB_D+(VA202) go to 3.3V → 48M Crystal on → USB_DATA is triggered → USB work

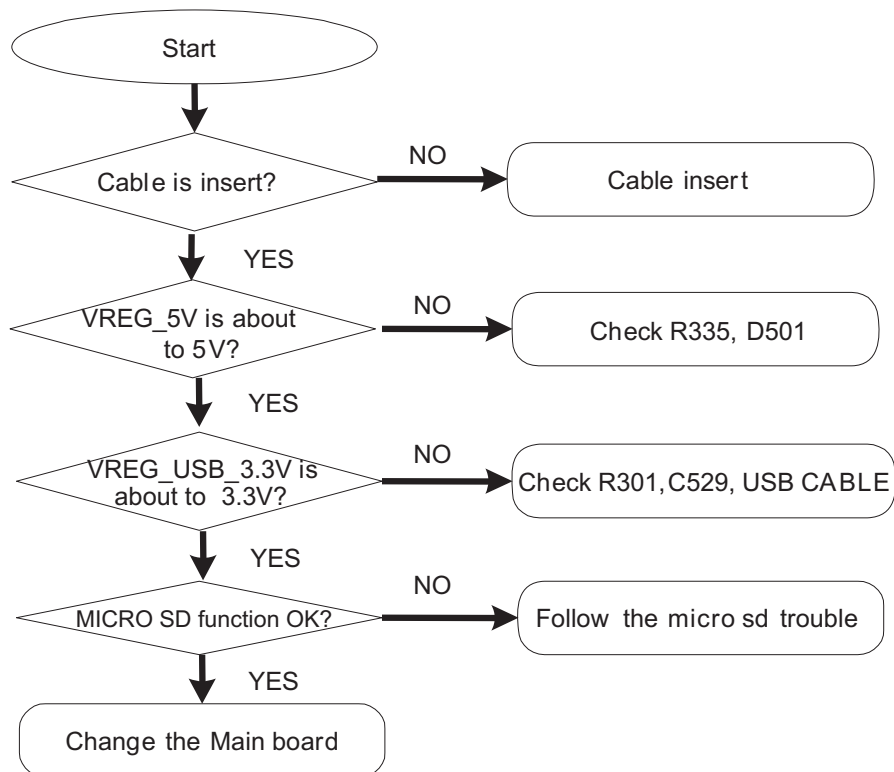


4. TROUBLE SHOOTING

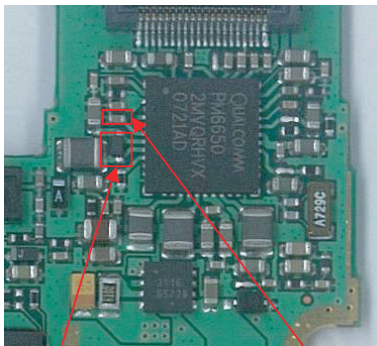
4.6.2 UMS(USB MASS STORAGE) trouble

UMS Initial sequence of KE990 is :

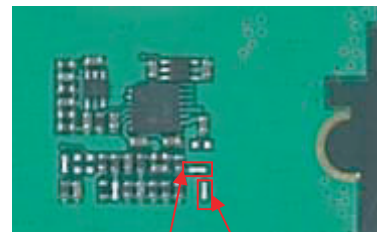
USB connected to KE990 → VREG_5V(R335, UMS) go to 5V → VREG_USB_3.3V(R301) go to 3.3V
→USB_DATA is triggered → USB work



< TOP SIDE >



D501(VREG_5V) C529 (VREG_USB_3.3V)



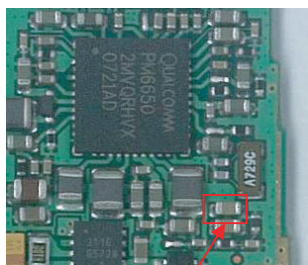
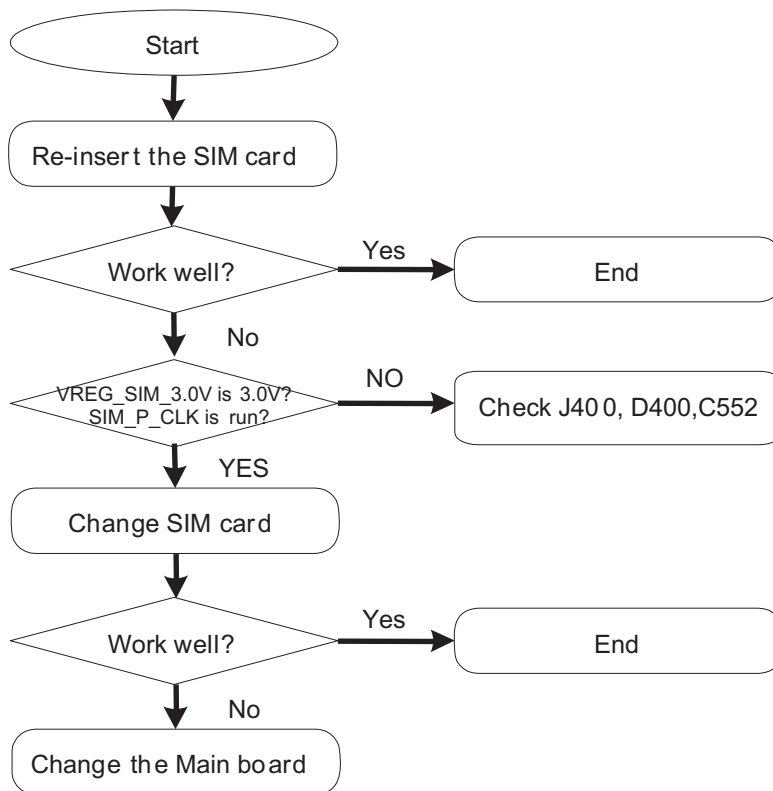
R335(VREG_5V)

R301(VREG_USB_3.3V)

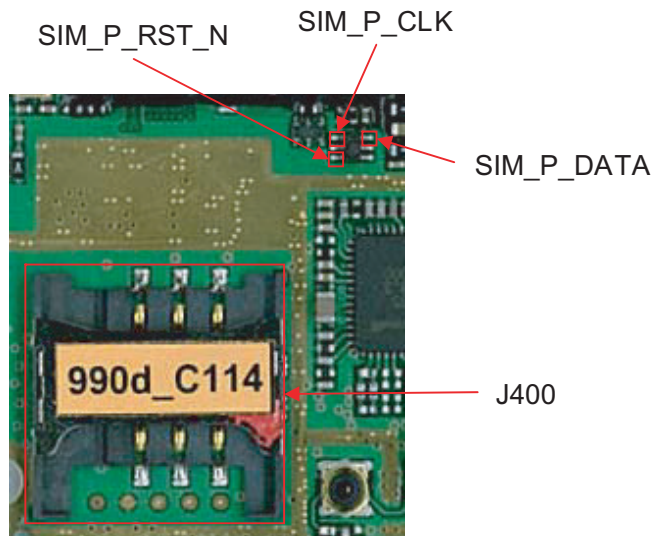
4.7 SIM detect trouble

USB Initial sequence of KE990 is :

VREG_SIM_3.0V(C552 of PM6635) go to 3.0V → SIM clock, reset and data triggered → SIM IF work (Schematic and place are refer to SIM technical brief)



C552(VREG_SIM_3.0V)

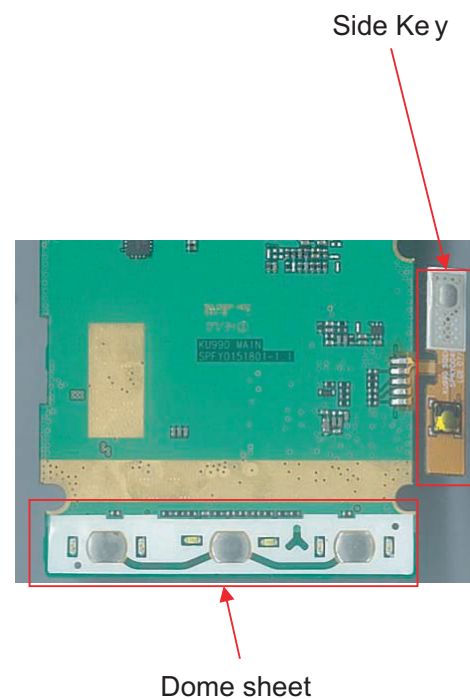
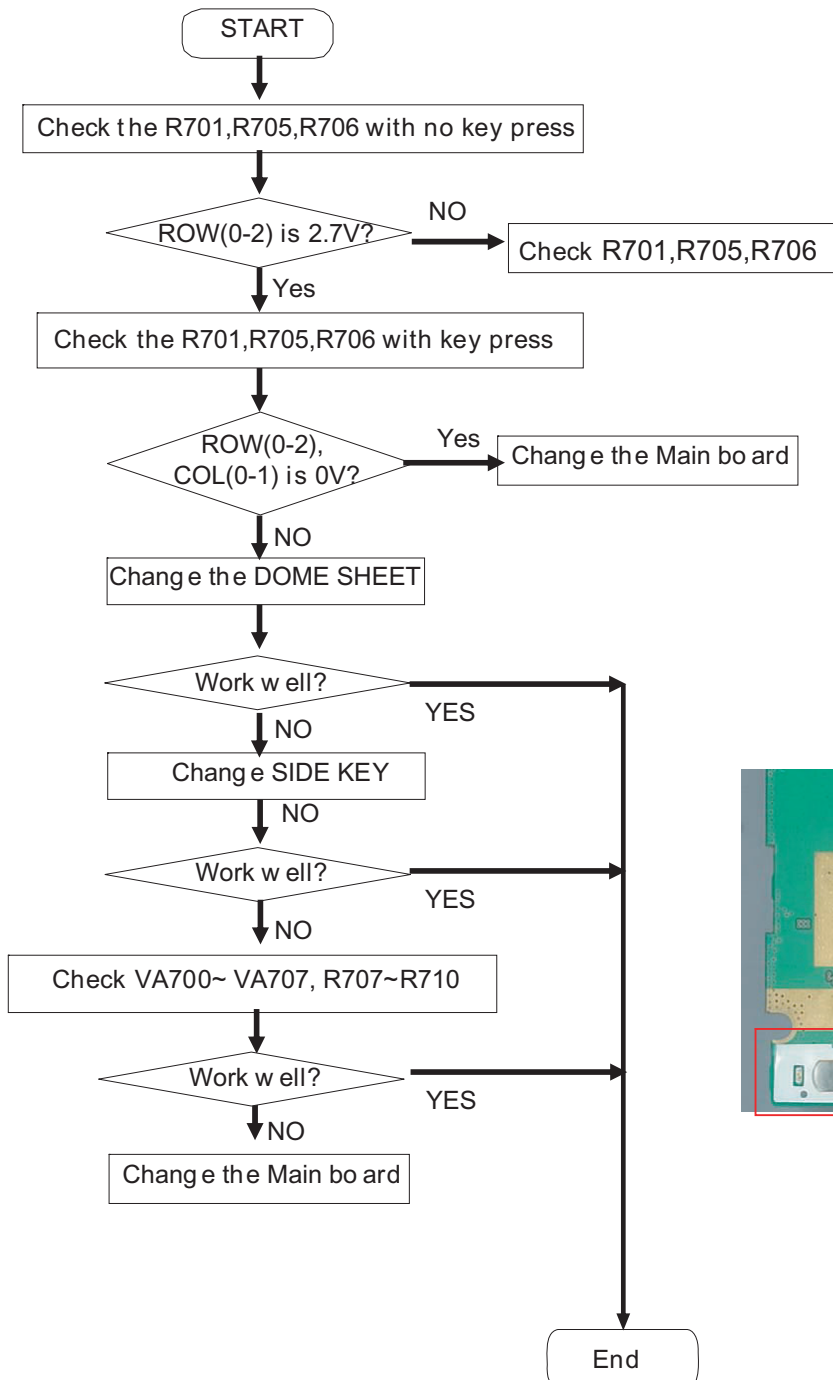


4. TROUBLE SHOOTING

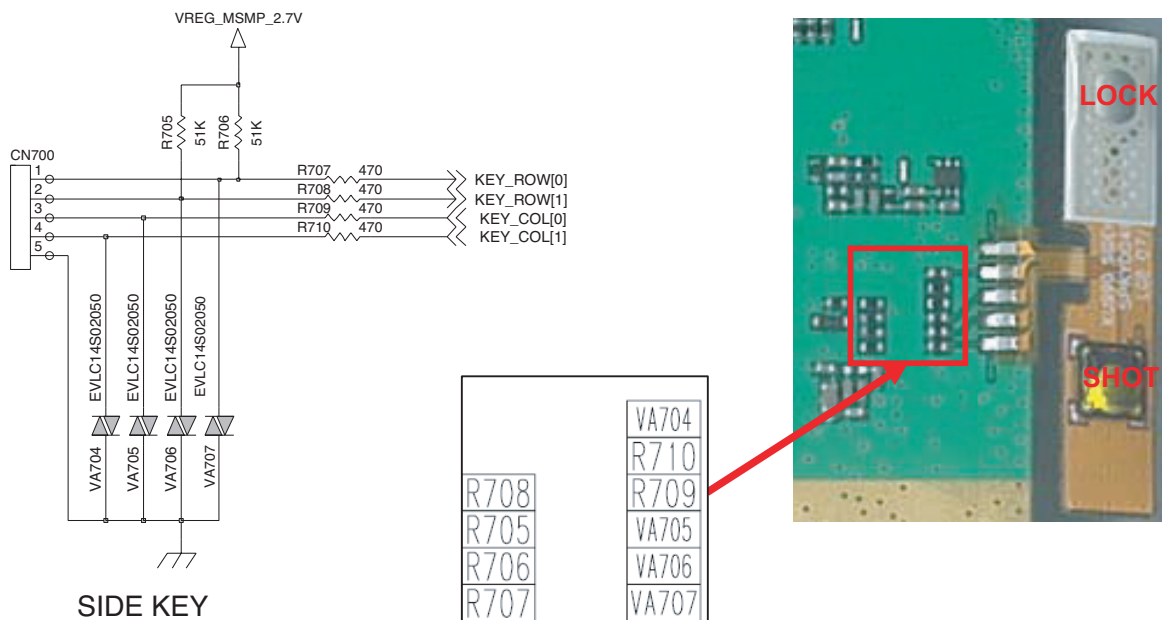
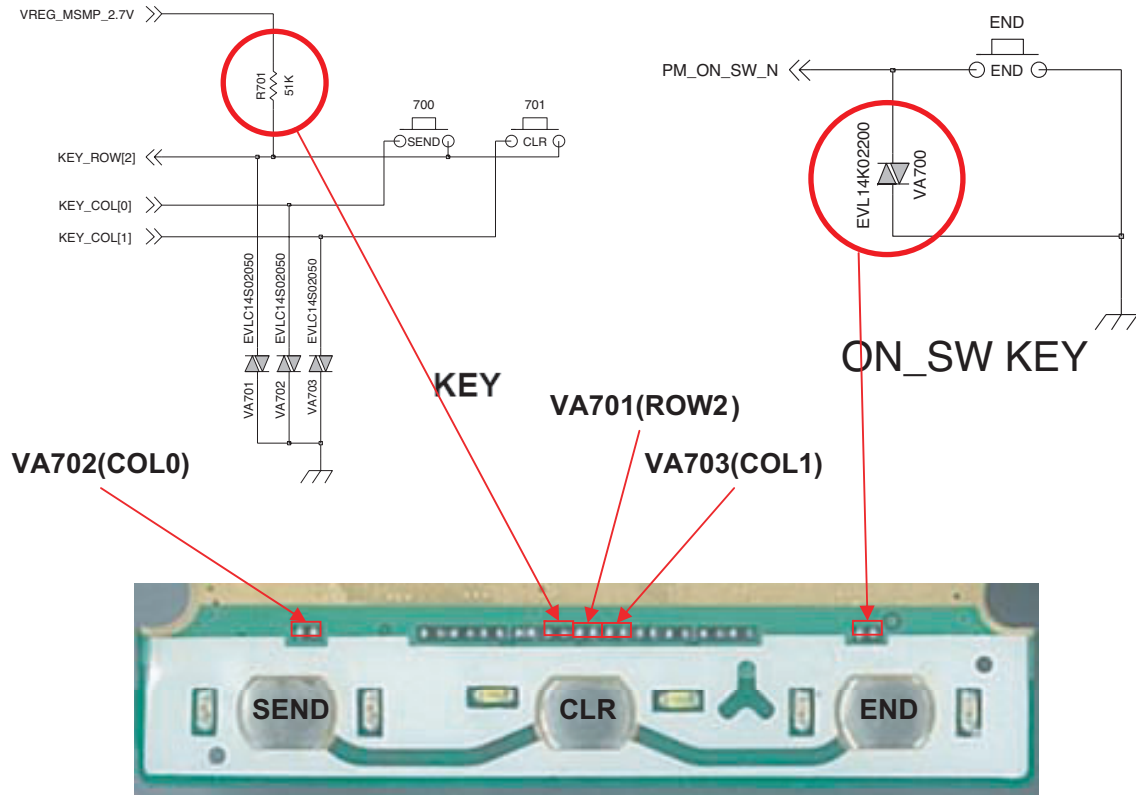
4.8 Key sense trouble (KEYPAD)

Key Sense sequence of KE990 is :

Default condition ROW(0-2) is 2.7V → Press the key → Corresponding ROW(x) and COL(x) go to 0V → Scan pulse(Col ⇒ Row) → ESM sense what key pressed.



4. TROUBLE SHOOTING



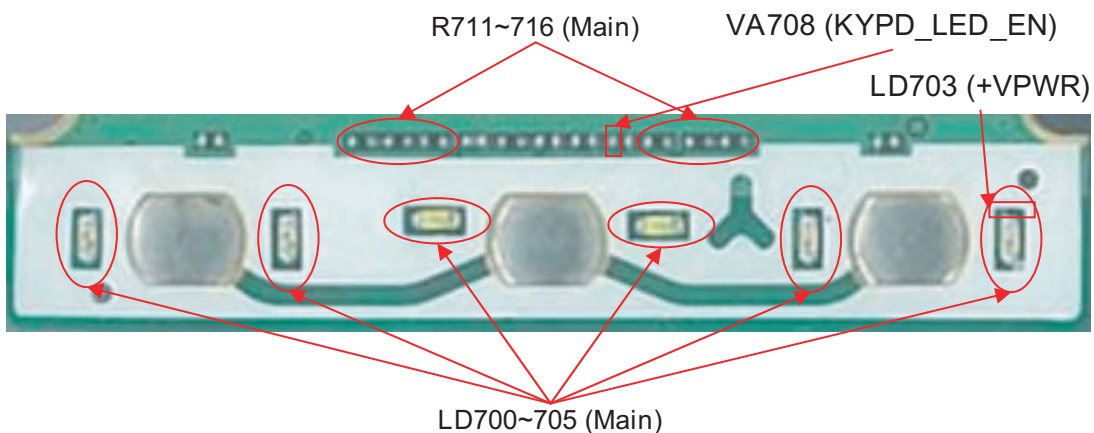
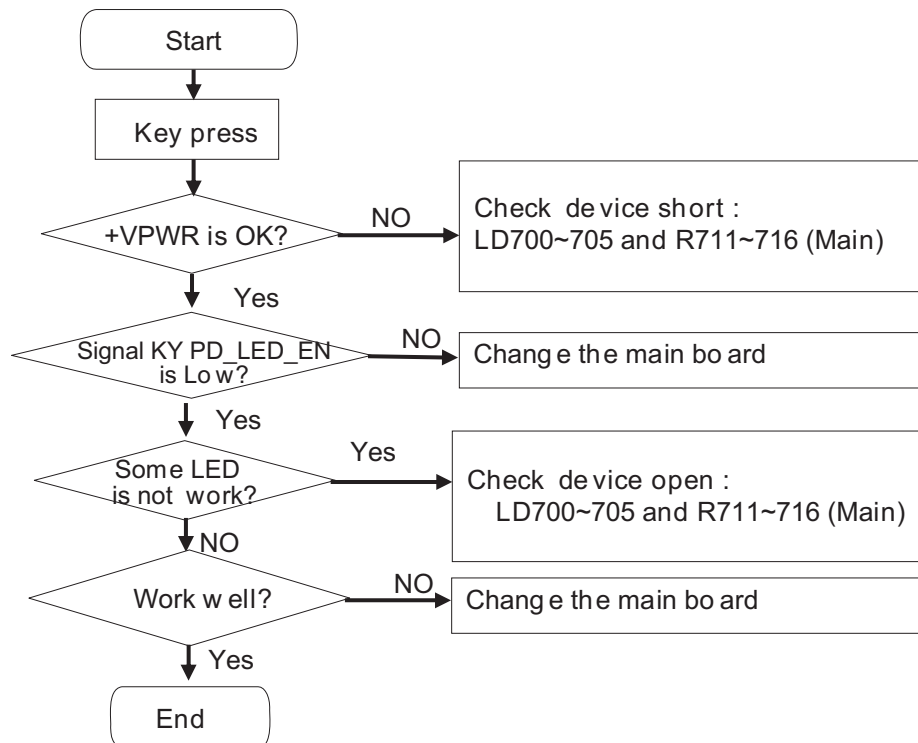
Schematic of key sense part

4. TROUBLE SHOOTING

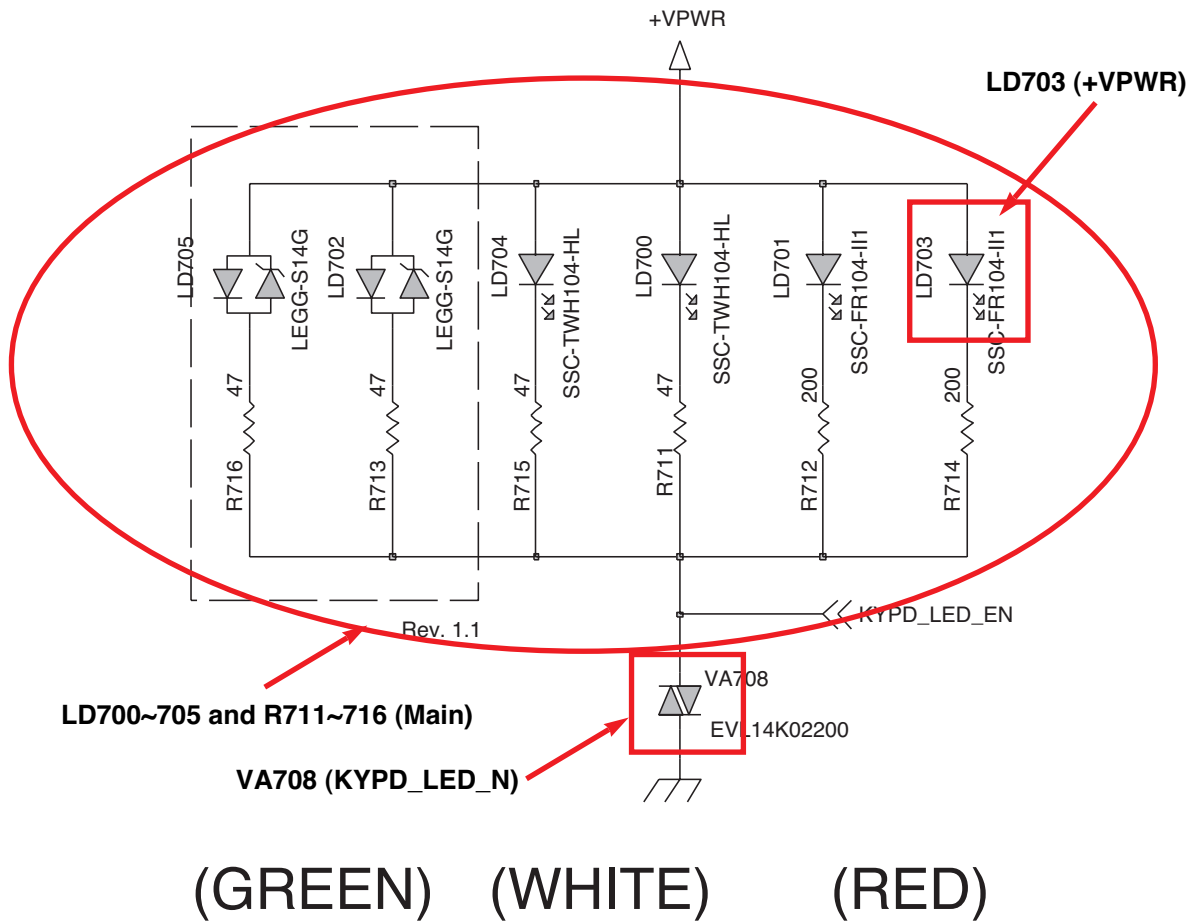
4.9 Keypad backlight trouble

Key Pad Back Light is on as below :

Key pressing → PM6635 KYPD_LED_EN go to Low → LED On (Key Pad LED controlled by PM6635)



4. TROUBLE SHOOTING



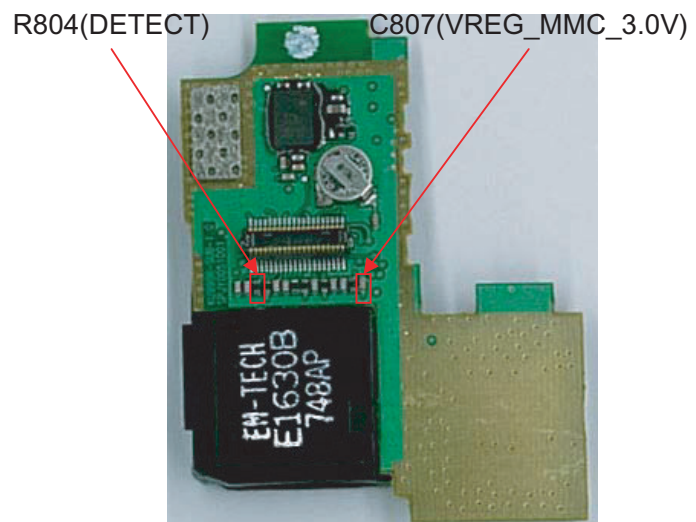
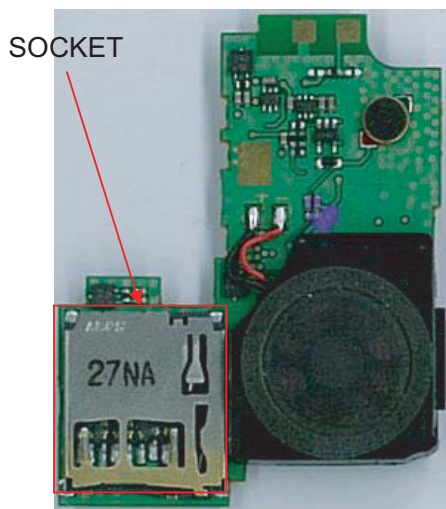
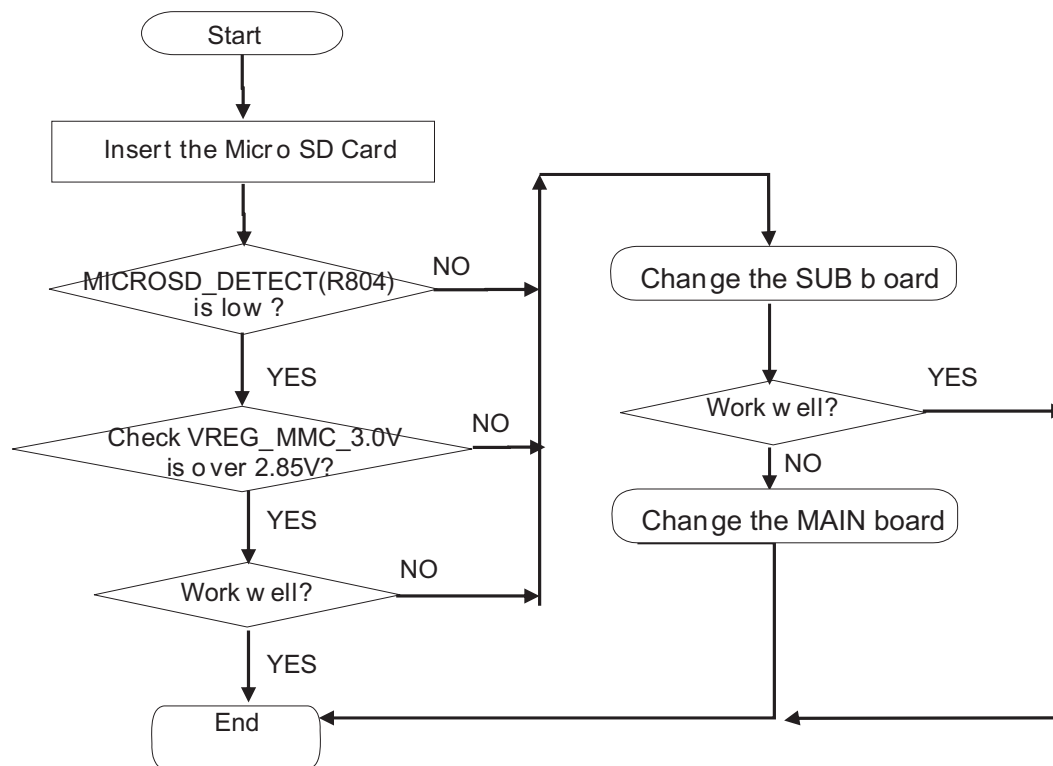
Schematic of keypad backlight part

4. TROUBLE SHOOTING

4.10 Micro SD trouble

Micro SD is worked as below :

Micro SD insertion → MICROSD_DETECT(R804) goes to low → go working

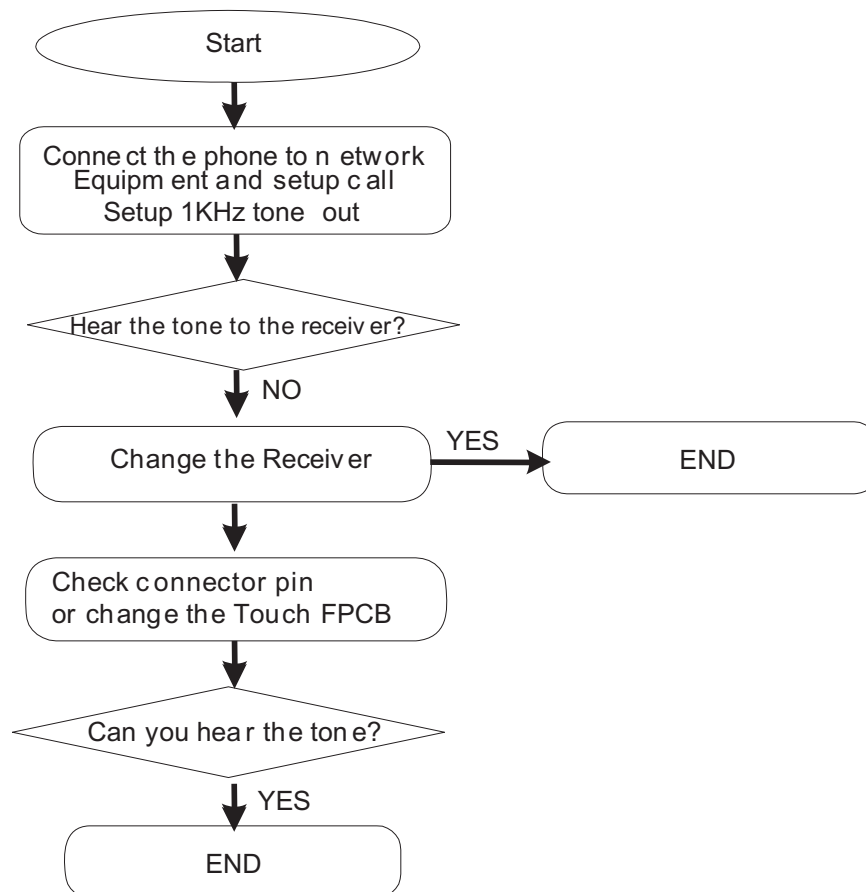


4.11 Audio trouble

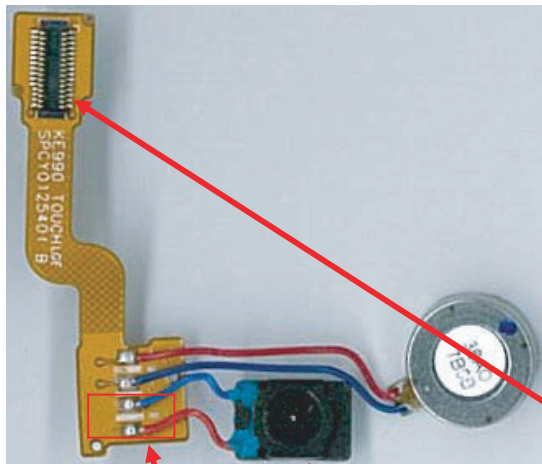
4.11.1 Receiver path

Voice Receiver path as below:

ESM6270 Ear1ON/Ear1OP → CN701(Touch FPCB connector) → Receiver

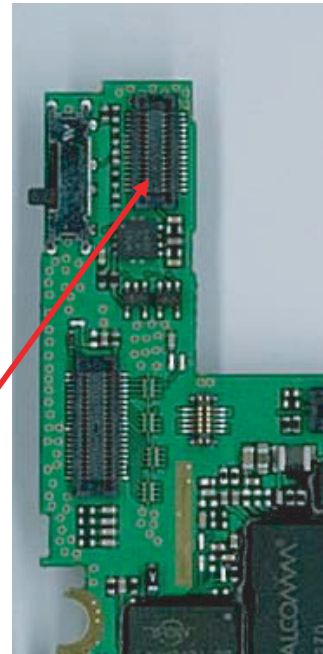


4. TROUBLE SHOOTING

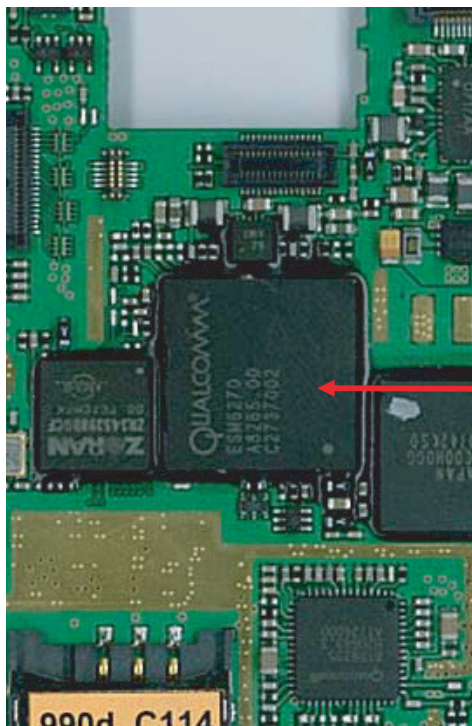


Receiver pads

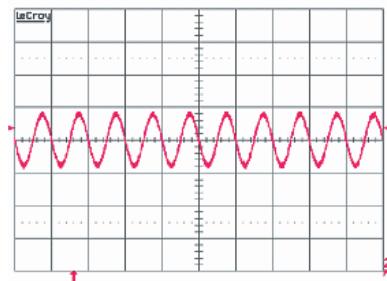
Receiver



Touch F PCB
connector



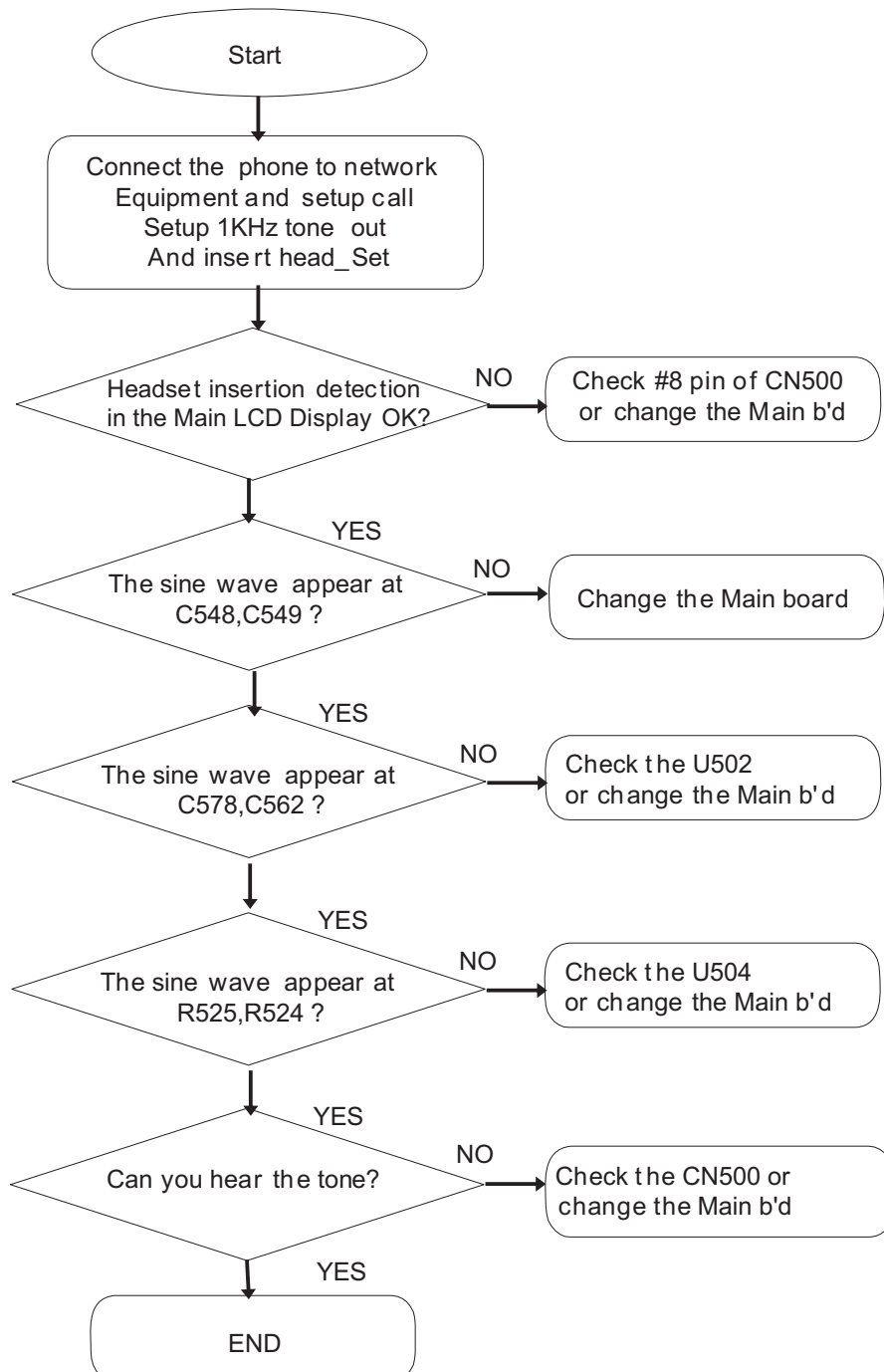
ESM6270

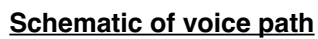


4.11.2 Voice path for headset

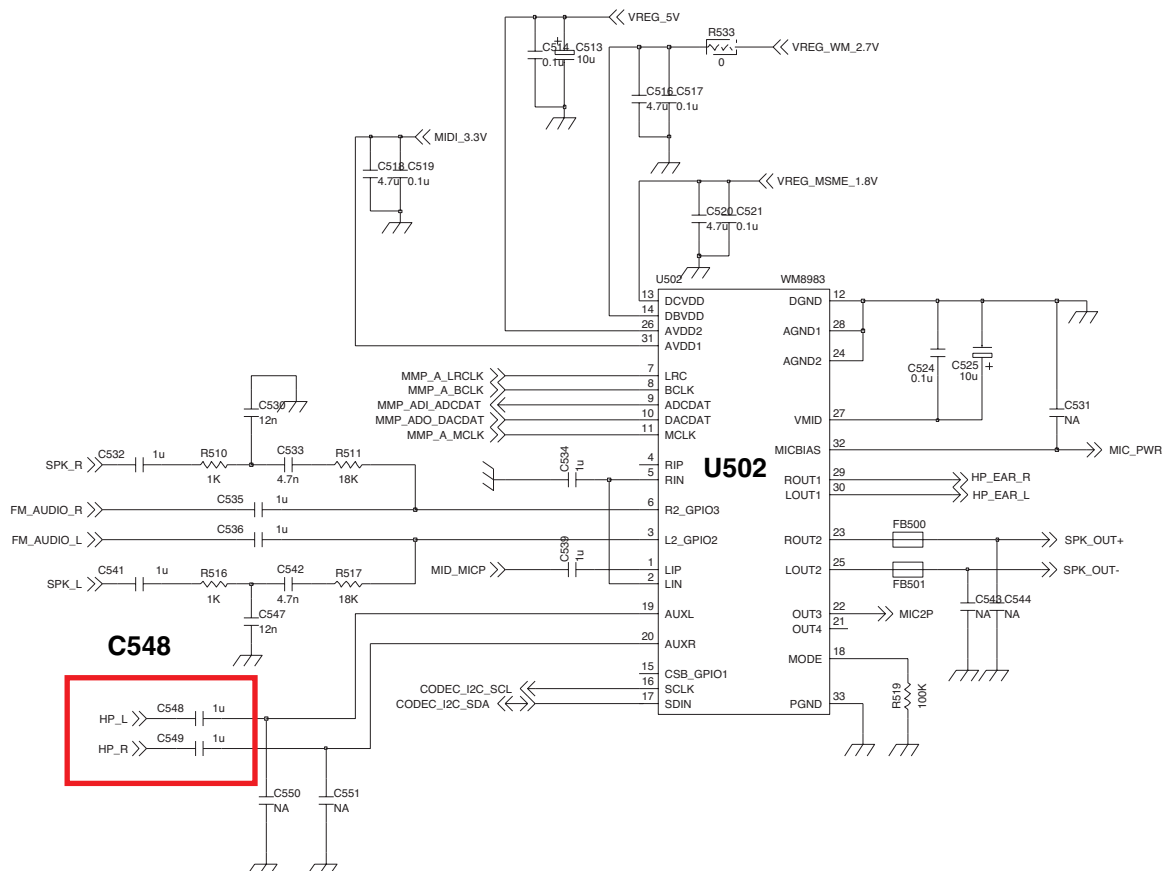
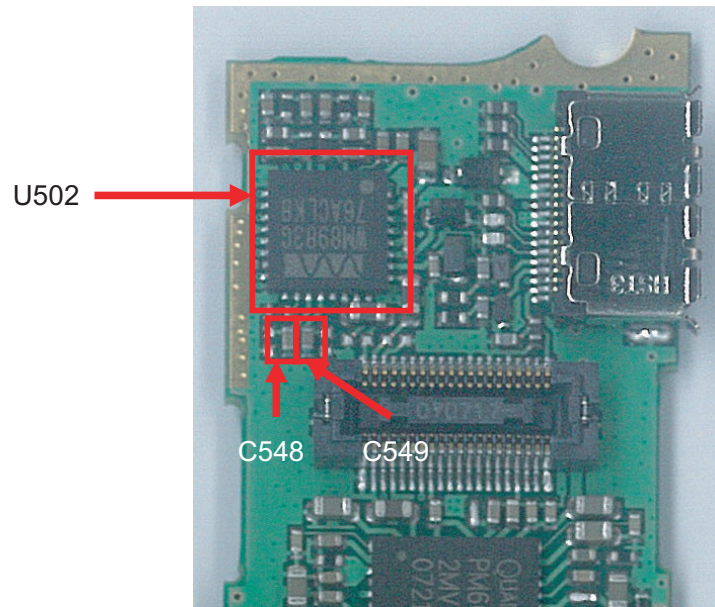
Voice path for Head_Set as below:

ESM6270 HPH_R, HPH_L → C548,C549 U502(audio codec) → C578,C562 → R529,C522 →
U504(Headset AMP) → FB502, FB503 → R525, R524 #4, #5 pin of CN500 headset Jack



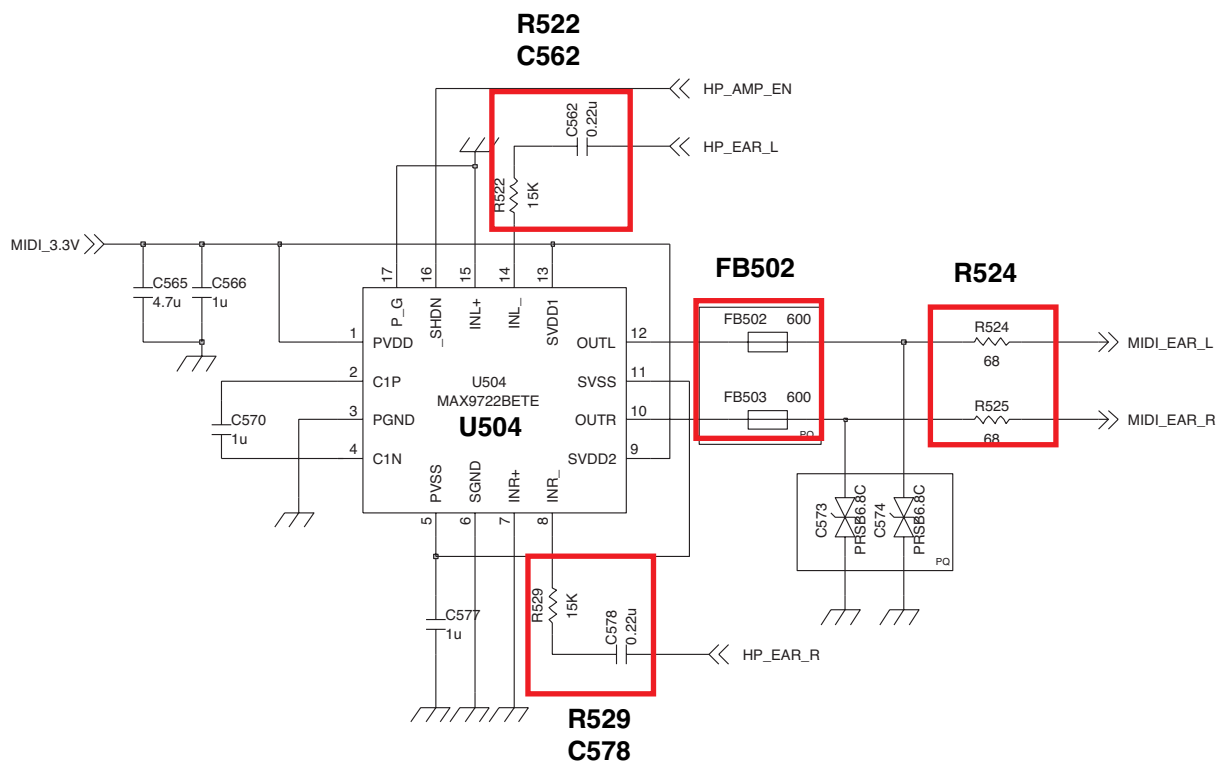
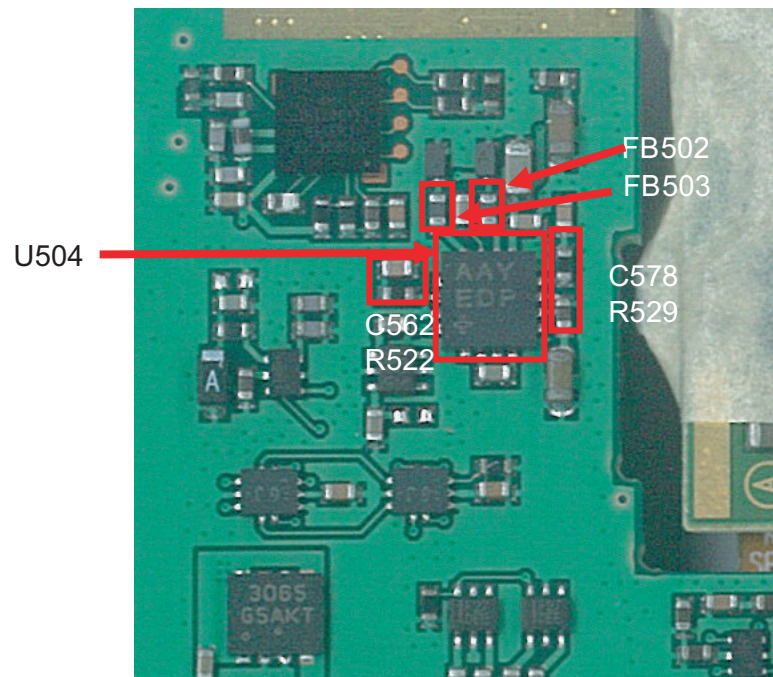


4. TROUBLE SHOOTING



Schematic of voice path

4. TROUBLE SHOOTING

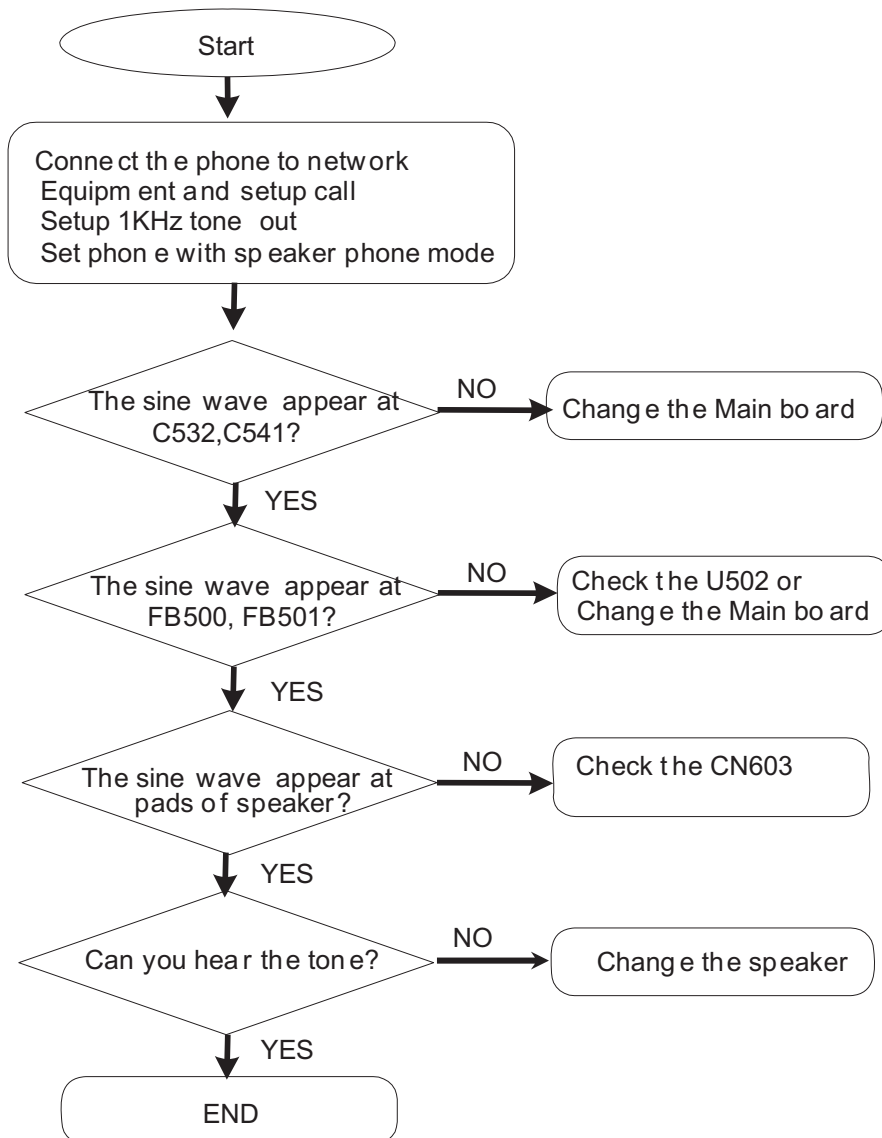


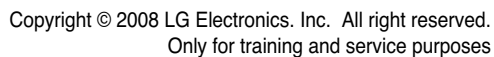
Schematic of voice path

4.11.3 Loud speaker path (voice speaker phone)

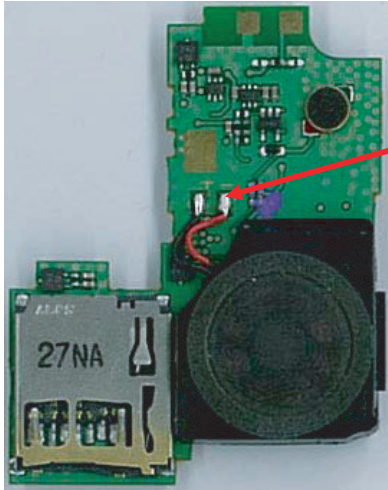
Loud speaker path as below:

ESM6270 SPK_R, SPK_L → C532,C541 → R510,R516 → C533,C542 → R511,R517 → U502(audio codec) → FB500,FB501 → CN603(B⁺toB connector) → OUT800, OUT801 (SPK PAD) → Speaker

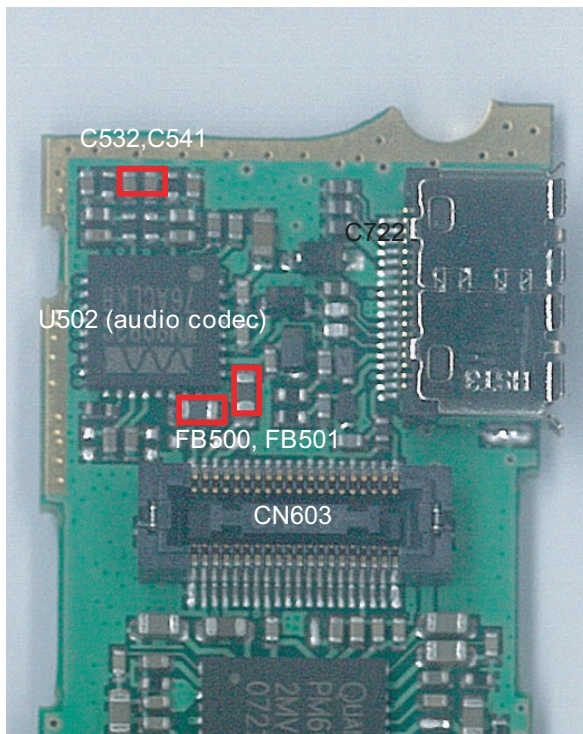
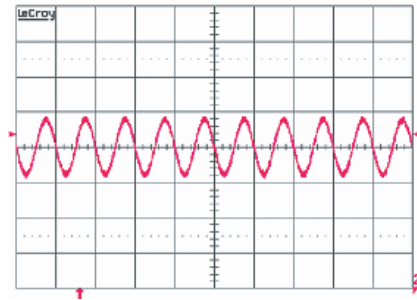




4. TROUBLE SHOOTING



Pads of Speaker

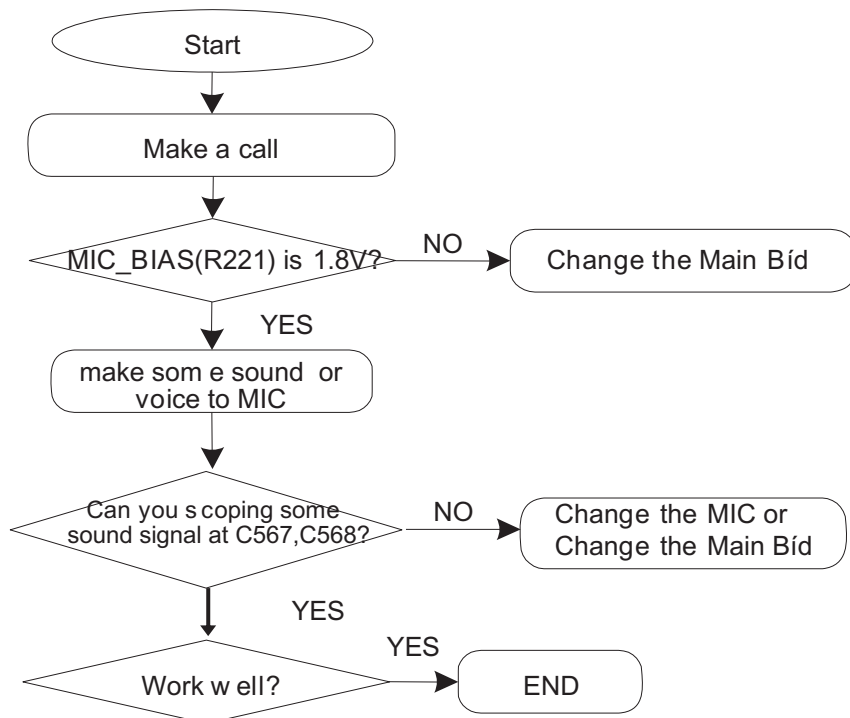
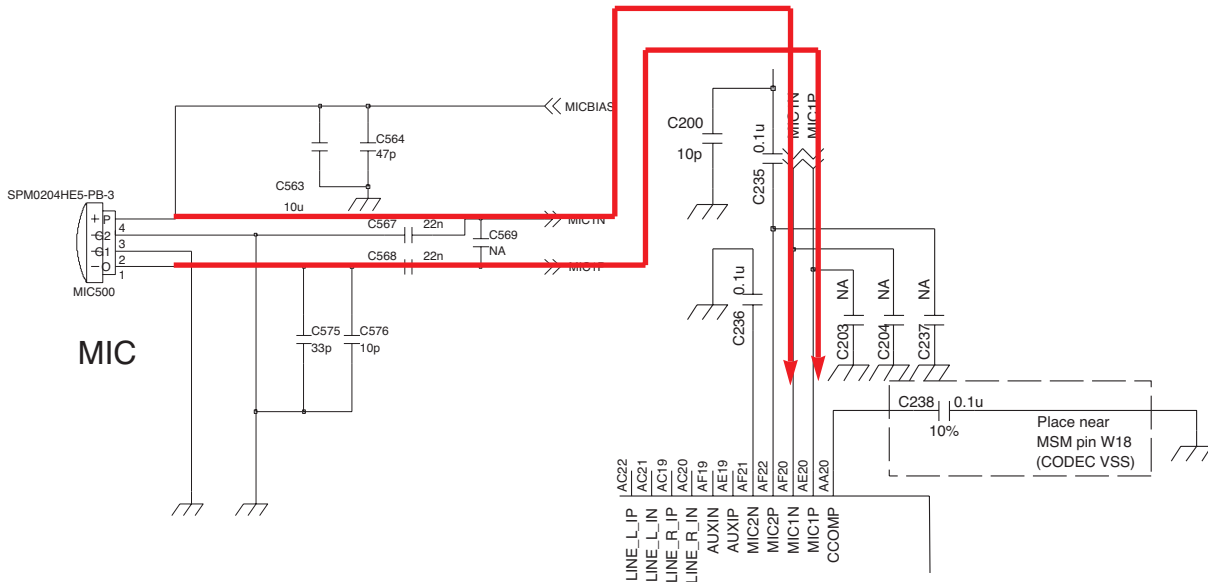


4. TROUBLE SHOOTING

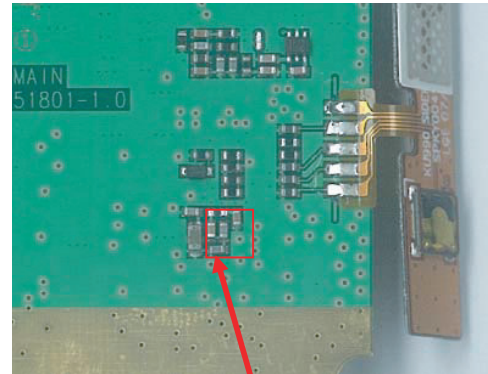
4.11.4 Microphone for main MIC

Main Microphone path as below:

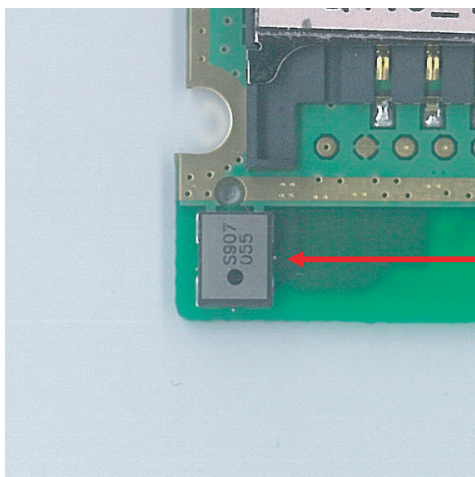
MIC → C567,C568 → ESM internal CODEC



4. TROUBLE SHOOTING



C567, C568



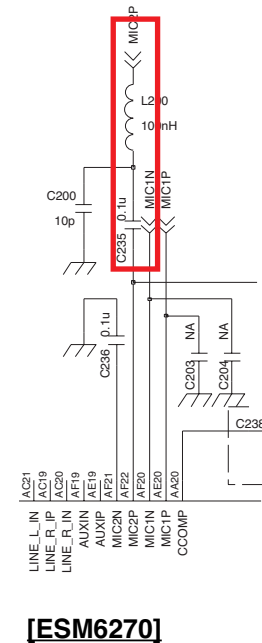
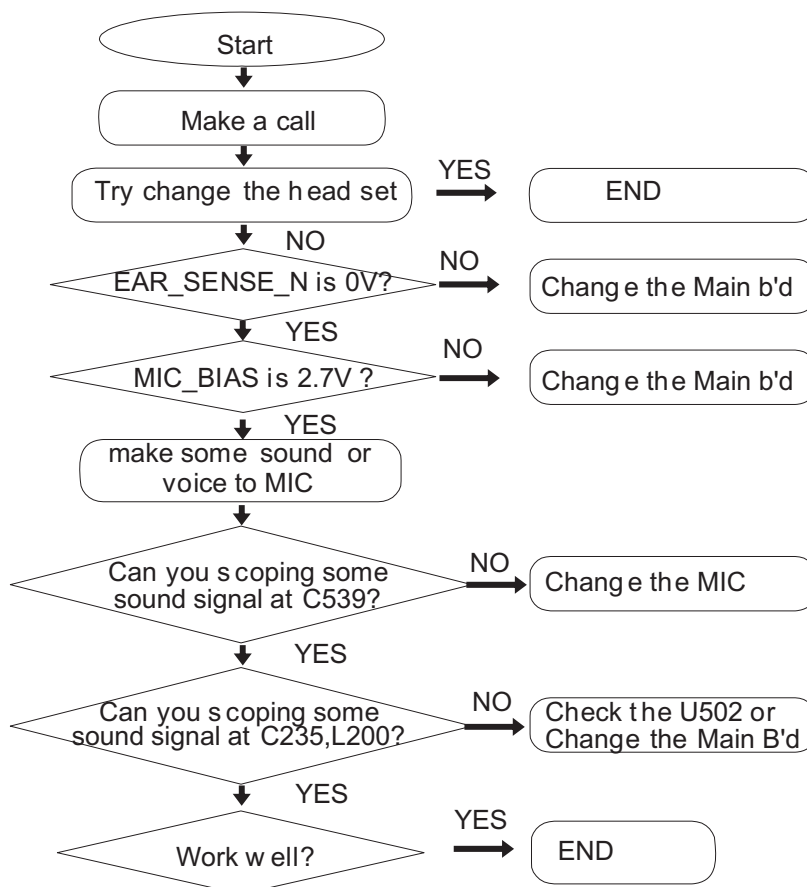
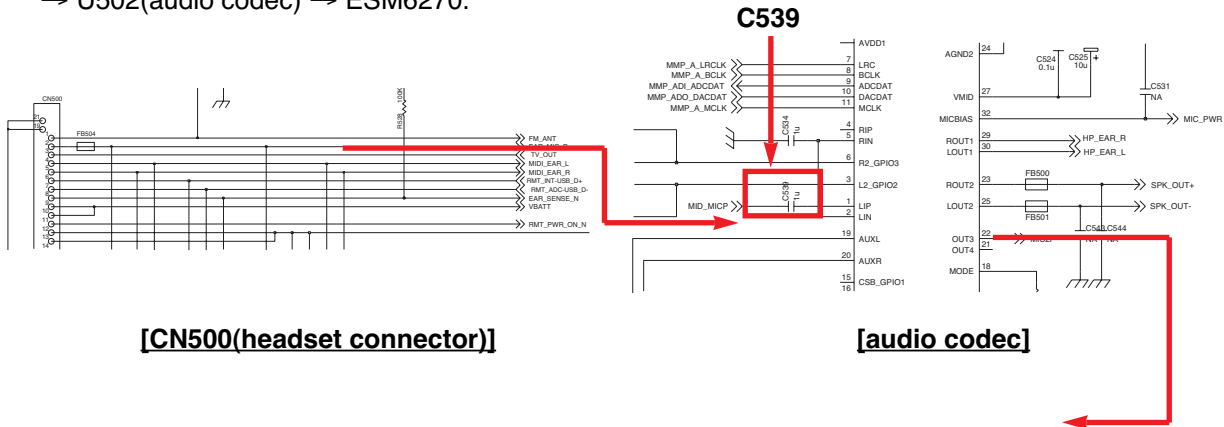
MIC500 (MIC for Handset)

4. TROUBLE SHOOTING

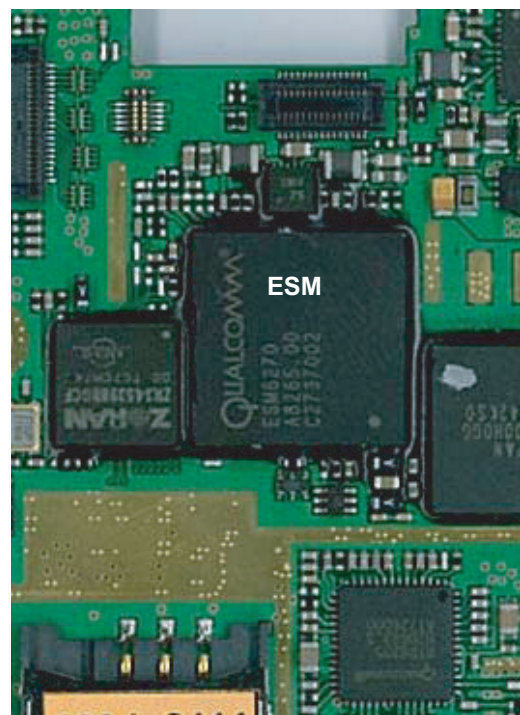
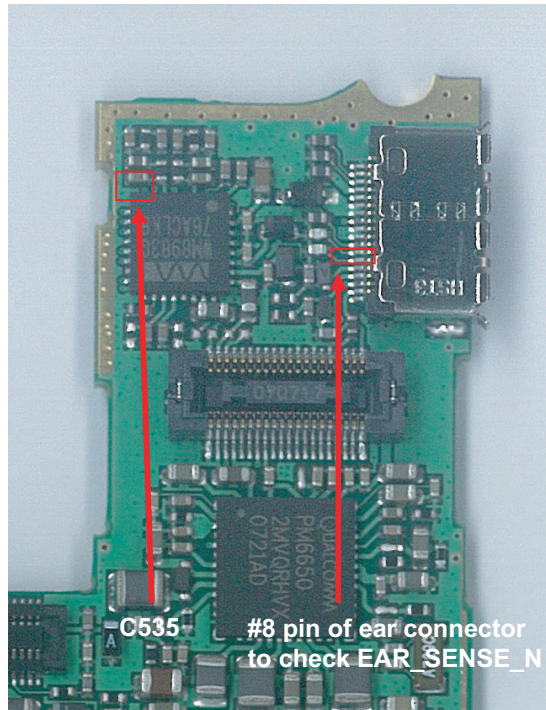
4.11.4 Microphone for headset

MIC for Head_Set path as below:

Insert Headset → EAR_SENSE_N(pin8) go 0V → ESM6270 sense Head_Set insertion → MIC signal
→ U502(audio codec) → ESM6270.



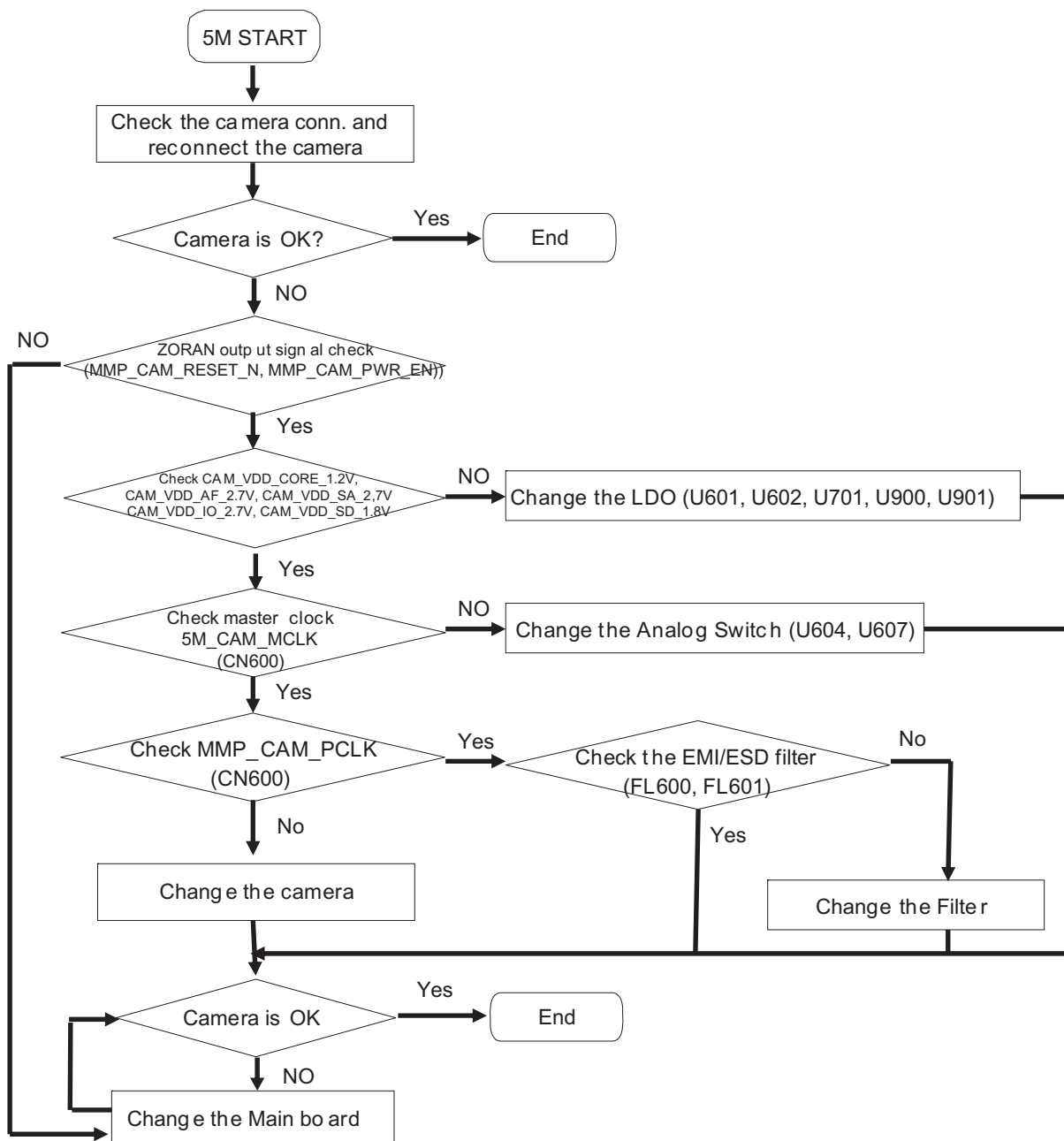
4. TROUBLE SHOOTING



4. TROUBLE SHOOTING

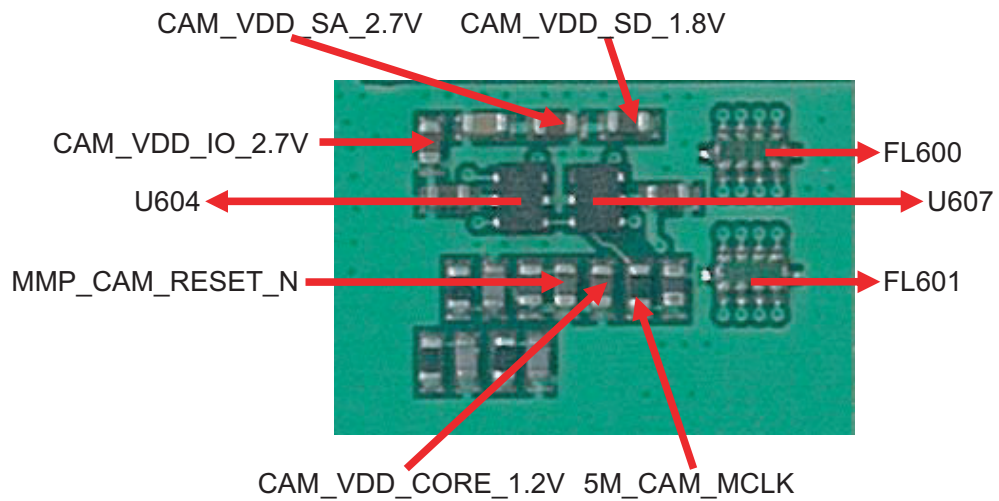
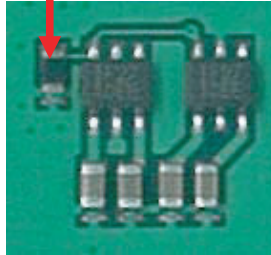
4.12 Camera trouble

Camera control signals are generated by ZORAN (Multimedia Chip) and directly connected with ZORAN.
KE990 has a 5 Mega Camera.

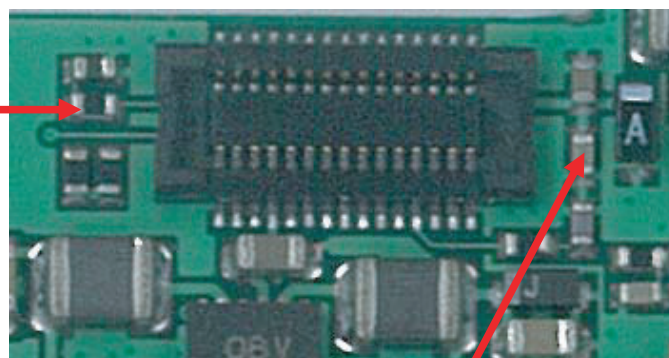


4. TROUBLE SHOOTING

MMP_CAM_PWR_EN

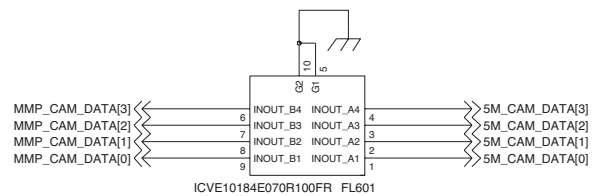
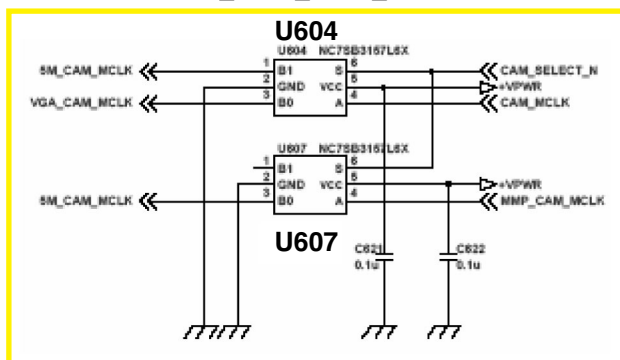
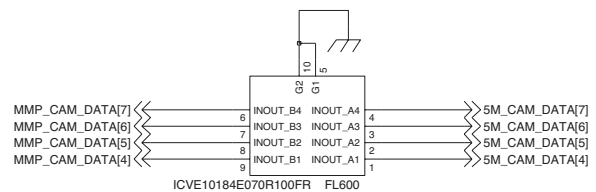
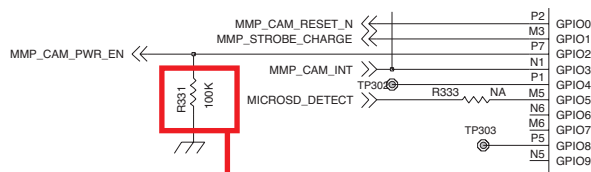
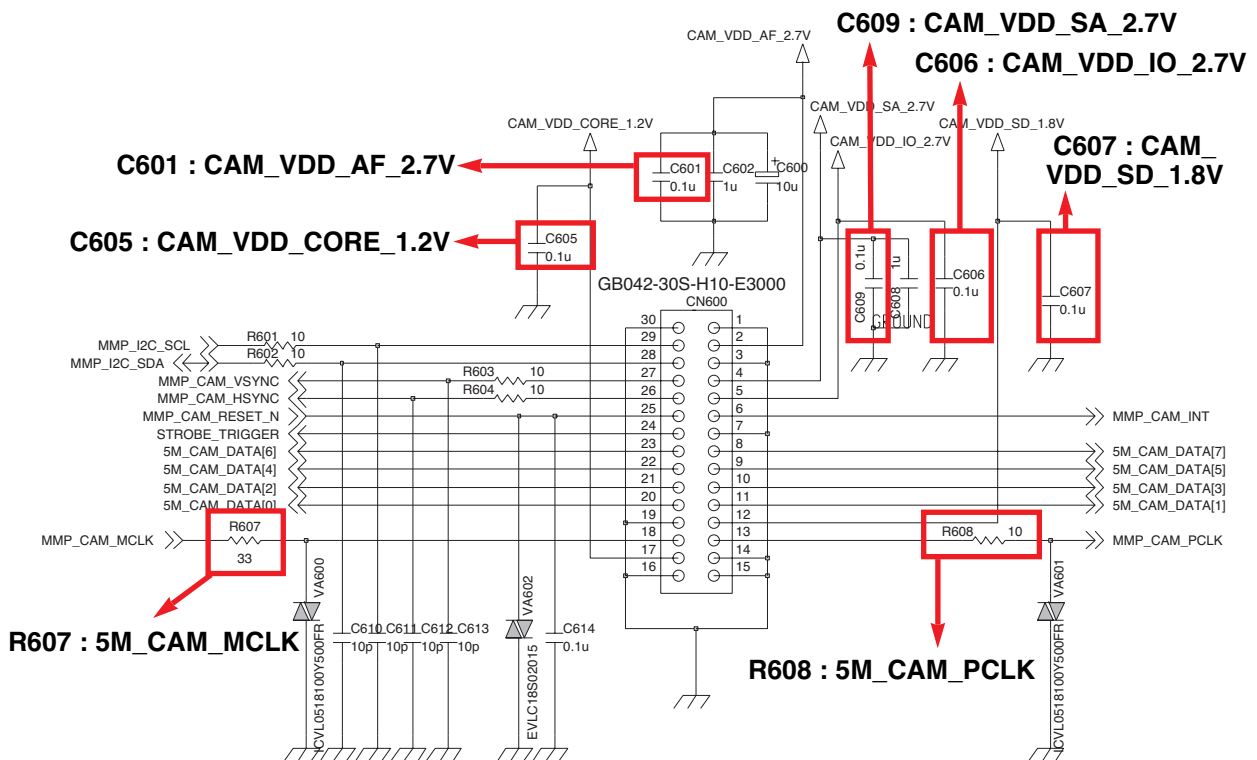


MMP_CAM_PCLK



CAM_VDD_AF_2.7V

4. TROUBLE SHOOTING

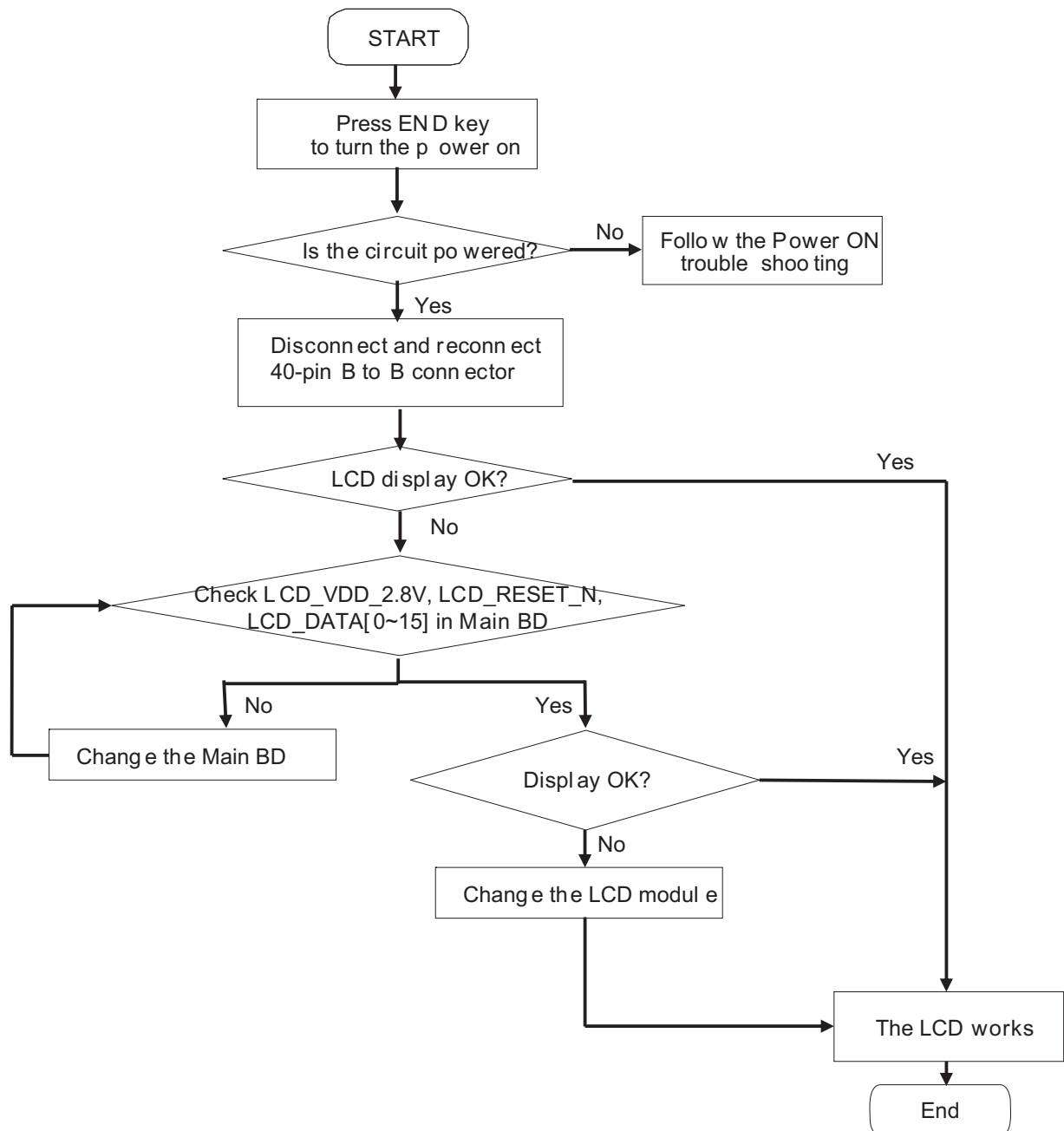


Schematic of 5M camera part

4.13 Main LCD trouble

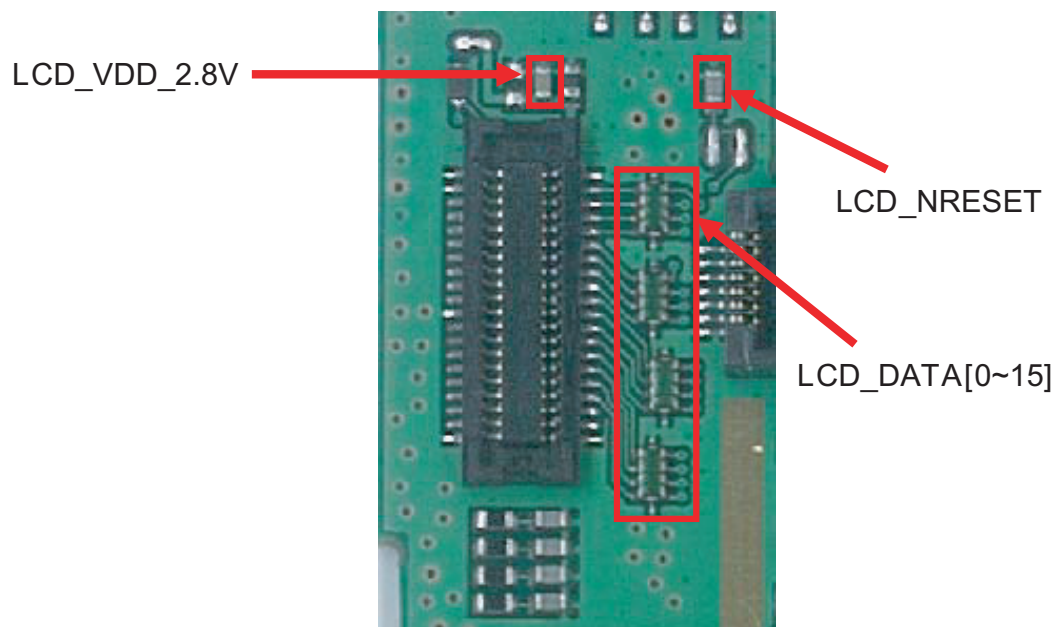
Main LCD control signals are generated by ESM6270. Those signal's path are:

ESM6270 → Z ORAN (Multimedia Chip) → 40-pin connector(CN300 in Main PCB) → 40-pin connector (in LCD Module)

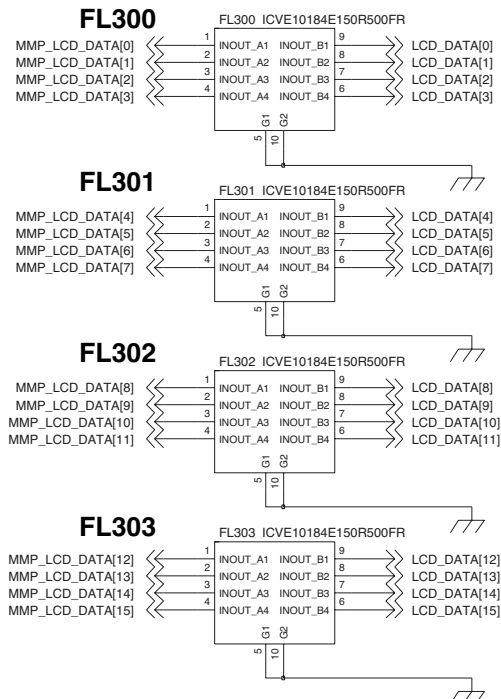
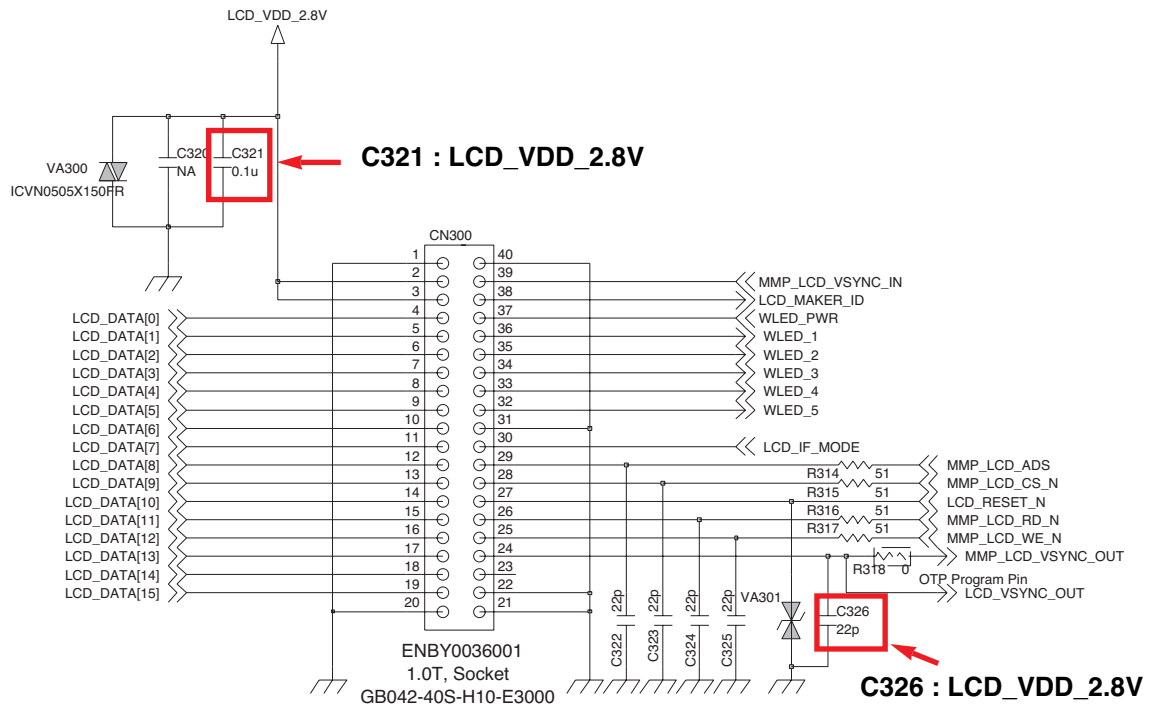


4. TROUBLE SHOOTING

Main BD



4. TROUBLE SHOOTING



Schematic of LCD part

4. TROUBLE SHOOTING

4.14 Bluetooth trouble

Bluetooth supplied voltages are generated by the PM6635.

Those signal's path are : PM6635 → VREG_MSMP_2.7V and VREG_BT_2.85V is asserted → TCXO_BT 19.2MHz is asserted → Bluetooth ON → BT_TX_RX_N is High → | BT serial interface control is operated (SBST / SBCK / SBDT)

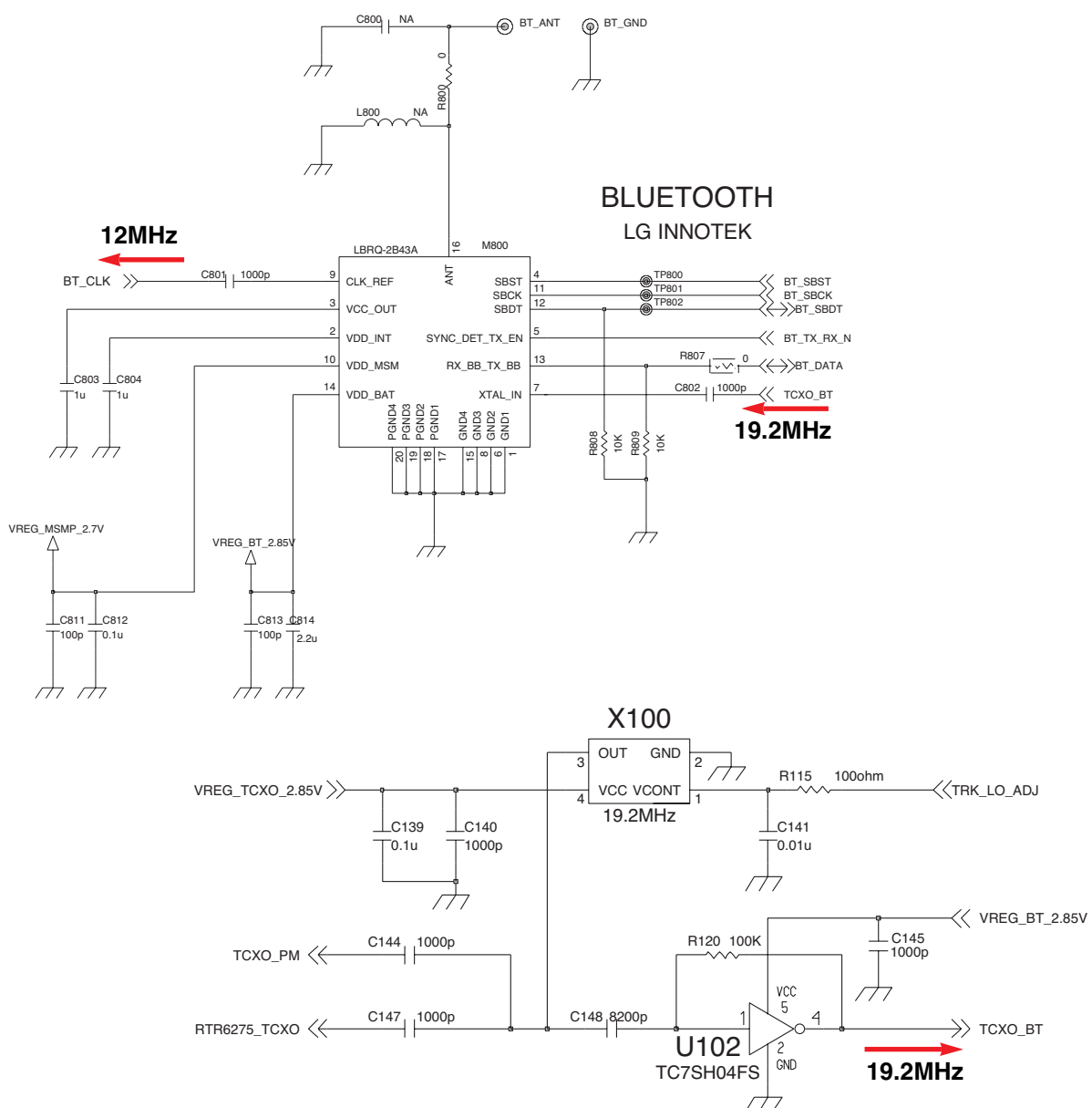


Figure. Schematic of Bluetooth Interface

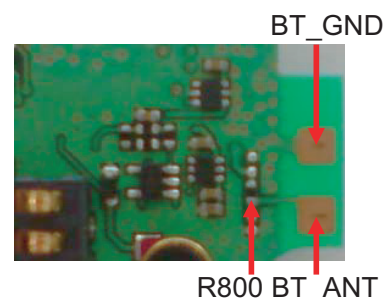
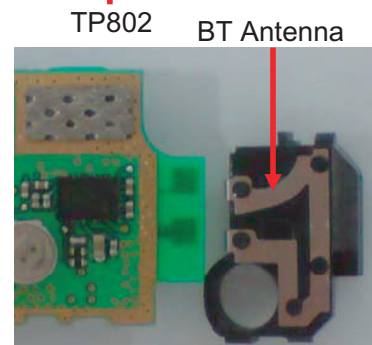
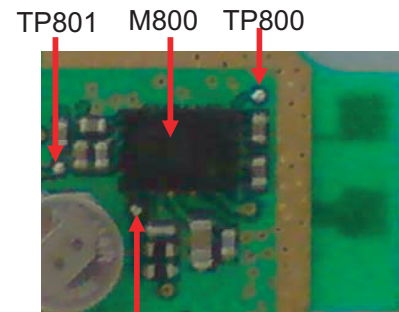
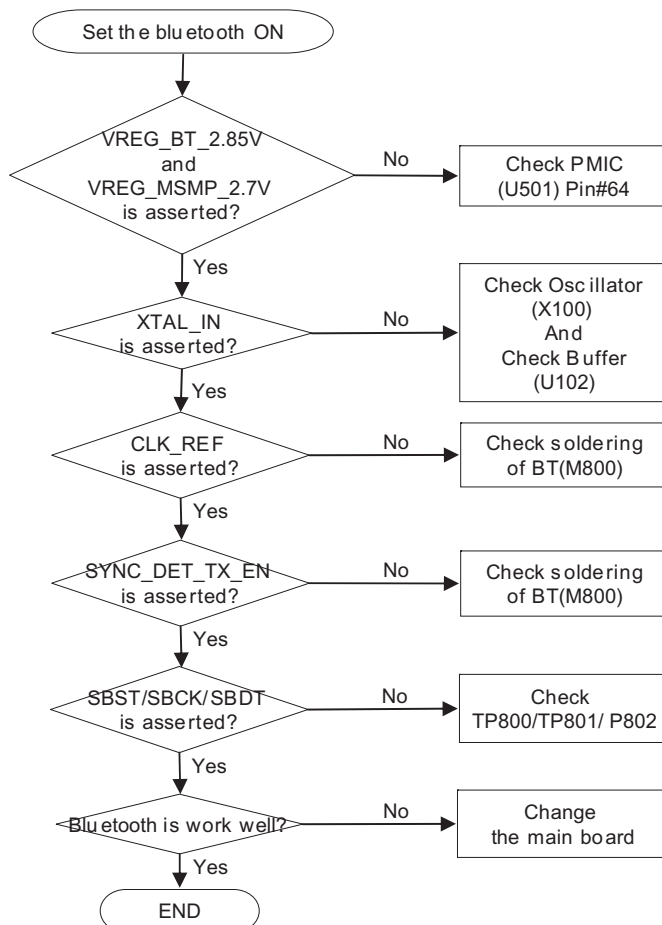
4. TROUBLE SHOOTING

Bluetooth RF Test



TC-3000A (Bluetooth Tester)

1. Set phone to bluetooth test-mode.
- Enter Test Mode(3845#*990#) → Module Test Set → BT DUT → BT DUT ON
2. Insert a phone in a TEMSELL (in case of radiation test)
3. Set 'discover' after push menu button of the tester and select the link analyzer .
4. After 'set test mode', confirm the connection state.
5. Measure the power of full channel after hopping mode is selected to 'ON'
6. You can select wanted test cases after getting an optimized power



4. TROUBLE SHOOTING

4.15 Touch Screen trouble

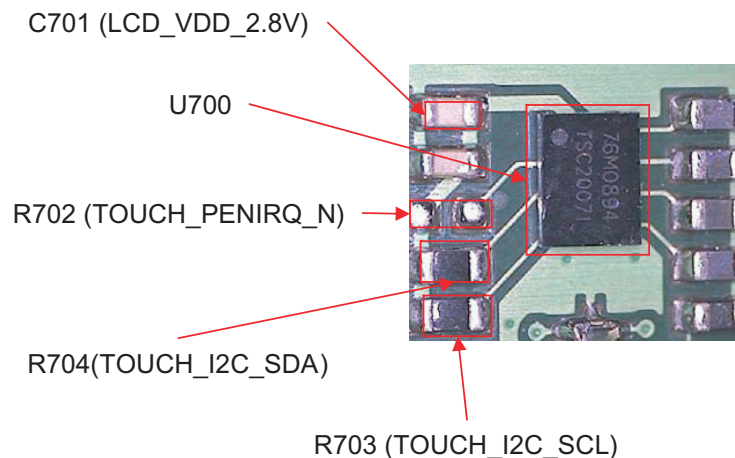
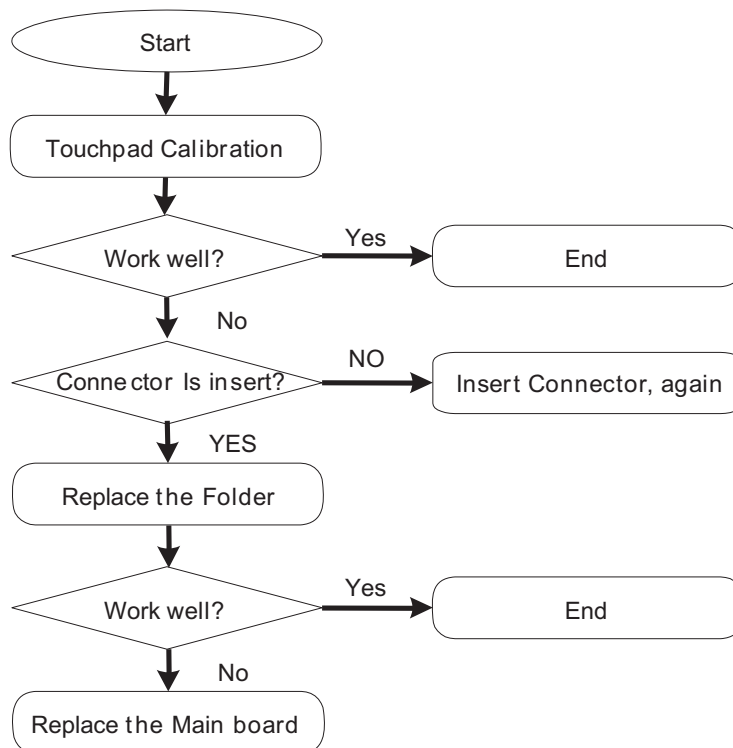
Touch Initial sequence of KE990 is :

LCD_VDD_2.8V(C701) goes to 2.8V → TOUCH_PENIRQ_N(R702), TOUCH_I2C_SCL(R703) & TOUCH_I2C_SDA(R704) go to high

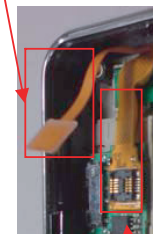
Touch operation of KE990 is :

A finger is touching on the screen → TOUCH_PENIRQ_N is low → I2C is connected → A finger is took off from the

Screen → TOUCH_PENIRQ_N is high → I2C is not connected.



Touch Window Con nector



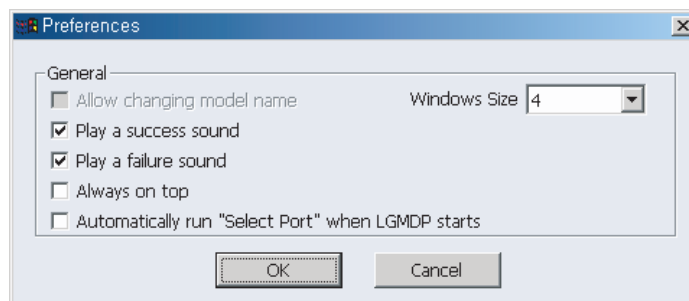
5. DOWNLOAD

5.1 Introduction

LGMDP is a LGE application that allow users to download images from PC to handset. LGMDP is a download tool with capabilities to upload image files to the handset. LGMDP is designed to be simple to use and easy enough for the beginner to upload executable images to the handset. LGMDP supports Windows 2000/XP where the LG (Ver 4.6 or later) USB modem driver is installed. Additionally, LGMDP allows multi downloading up to 9 handsets at the same time.

5.2 Downloading Procedure

- Connect the phone to your desktop PC using the USB cable and run the LGMDP application. Before getting started, set up LGMDP preferences from the Preferences of the file menu the way you want. Click on the File menu and select Preferences.



➤ **Play a success sound**

It will be played a .wav file when the download has been completed. To enable this simply check the box.

➤ **Always on Top**

Check if LGMDP always appears at the top of the window so that user can monitor it all the time.

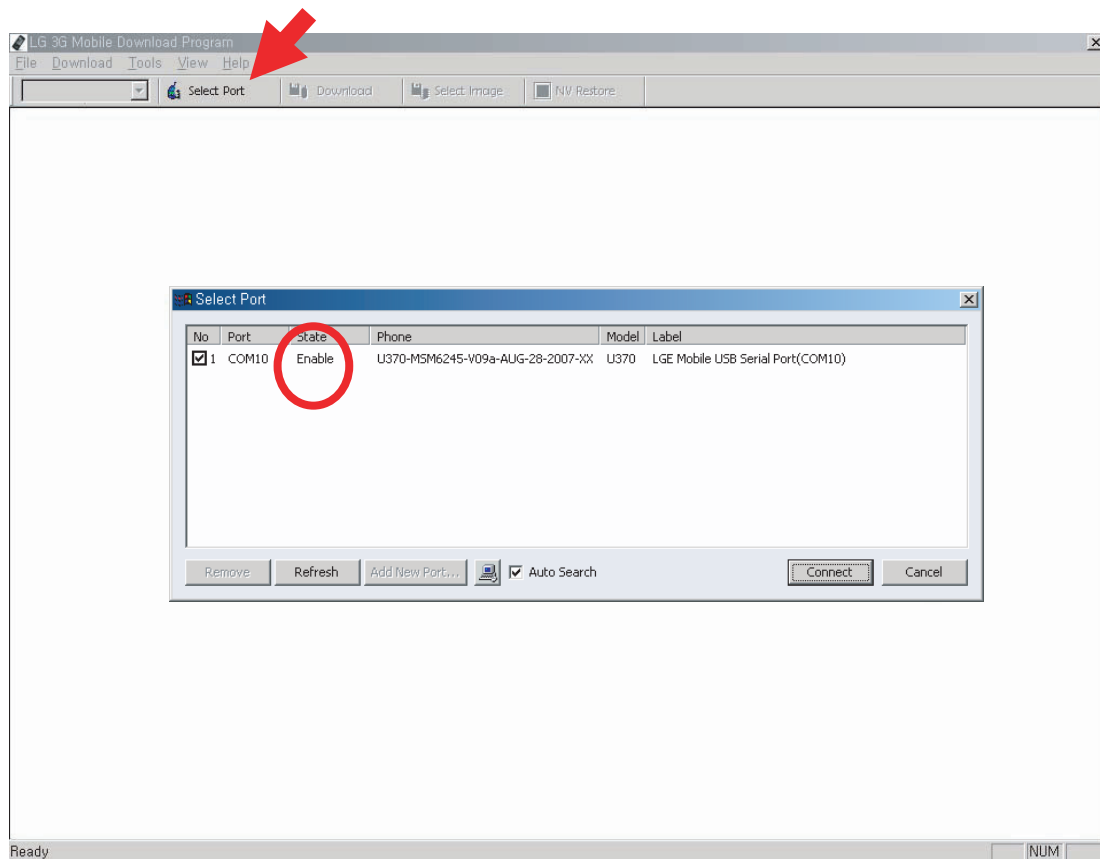
➤ **Automatically run Select Port When LGMDP starts**

When LGMDP starts, it will automatically select Select Port button to download new image file.

5. DOWNLOAD

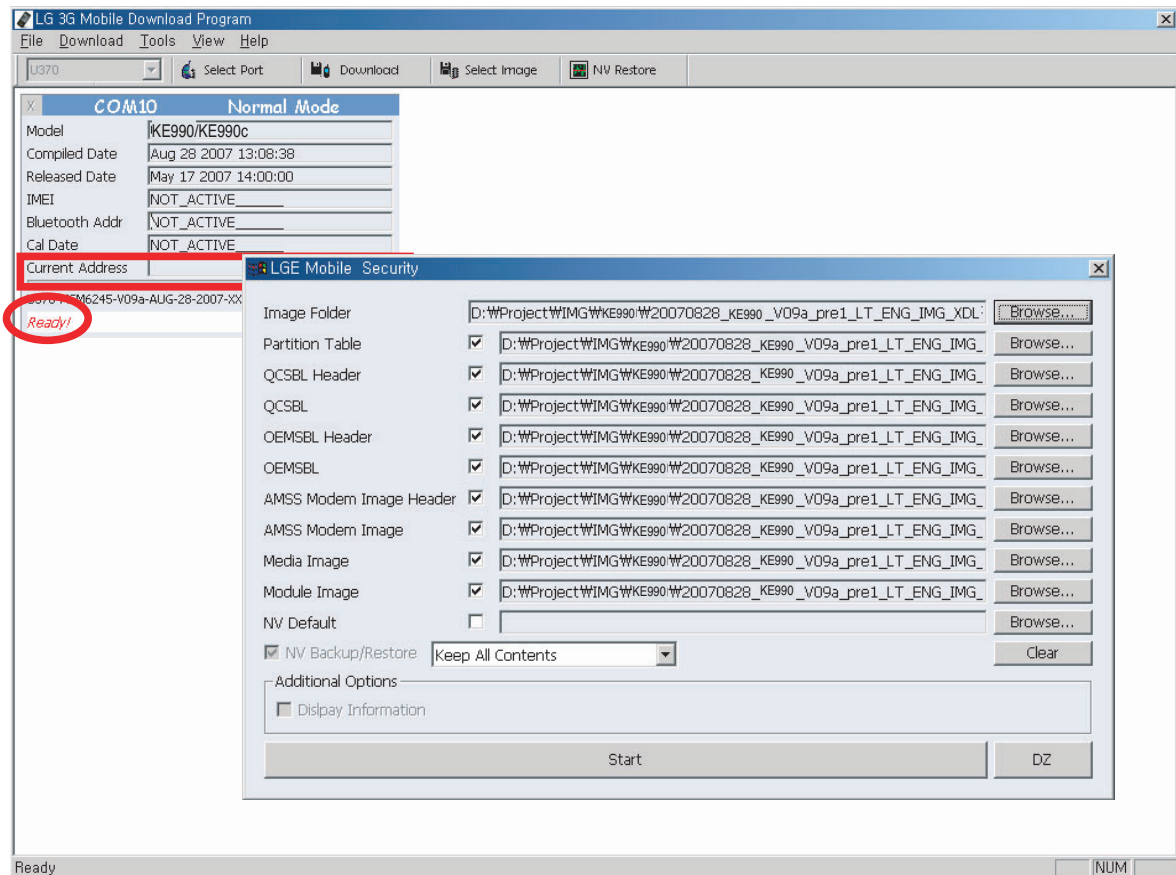
5.2.1 Connecting to PC

- Click on the Select Port and then Select Port window will be pop up. Check if state shows Enable for the port to be connected for downloading images. Then click on the Connect button.
(The port number(COM7) shall be different from that of the port number in the snapshot.)



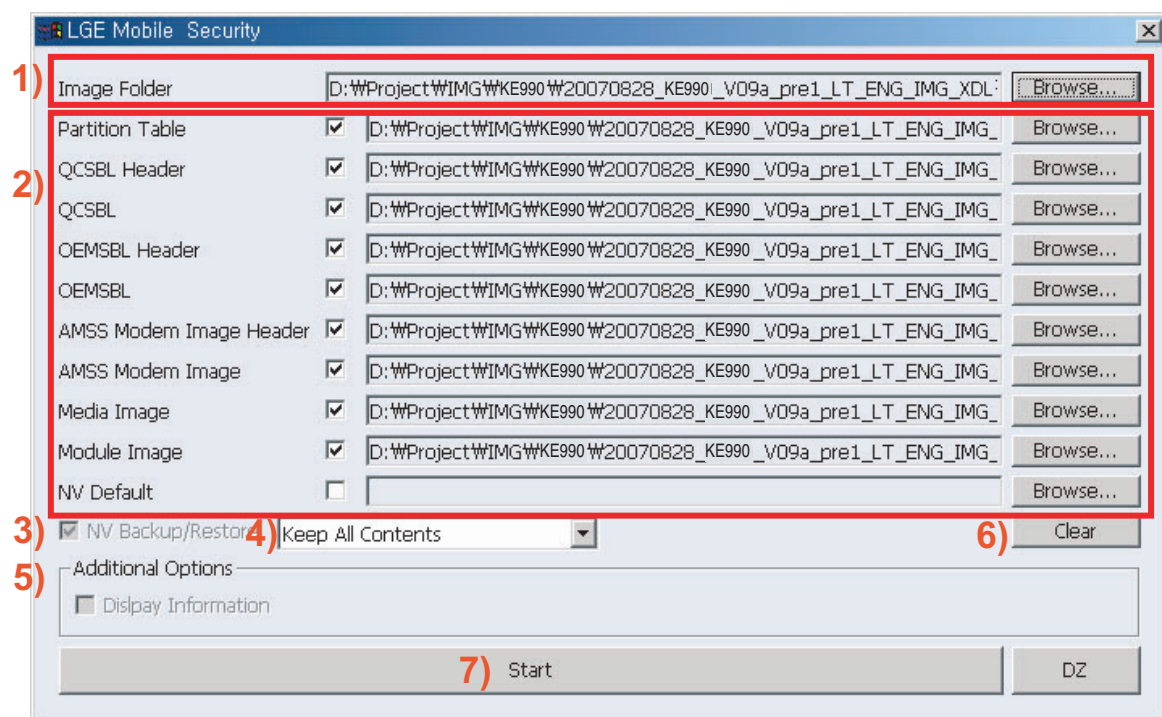
5. DOWNLOAD

- The status Ready is displayed when the application is ready for downloading.
While the images are transmitted from PC to the handset, a progressive bar (Red box) indicating the degree of transmission of data is displayed.



5. DOWNLOAD

- 1) Image Folder indicates loot path where all image files are placed. To change location of the default image path, select Browse... button. The edit box shows the file path where images are located. Please note that all images should be located in a selected folder.
- 2) Click on the Browse... button to select image files to be downloaded on the handset.
- 3) NV Backup/Restore: NV Backup/Restore always have to be done, and it is default selected option. Backup the NV data and restore the backed up NV data automatically.



4) Reset database & Contents:

User related data including the setting data on the EFS is reset in the handset. The user contents in the handset will be erased. If you want to reset all the user data back to the way they were before you started downloading new images, check the option.

Erase_EFS:

The calibration data, user contents, media, and module are erased. Only calibration data is kept when NV backup/restore is checked. The user contents and file system physically are wiped out.

Keep All Contents

Maintain user data including WAP, AD, DRM, E-mail, Play lists, and images when downloading a new S/W images. User data stated above are maintained if this option is selected.

5) Additional Options:

Display Information is defaultly not selected and user cannot choose.

Override partition table is also defaultly not selected and user cannot choose.

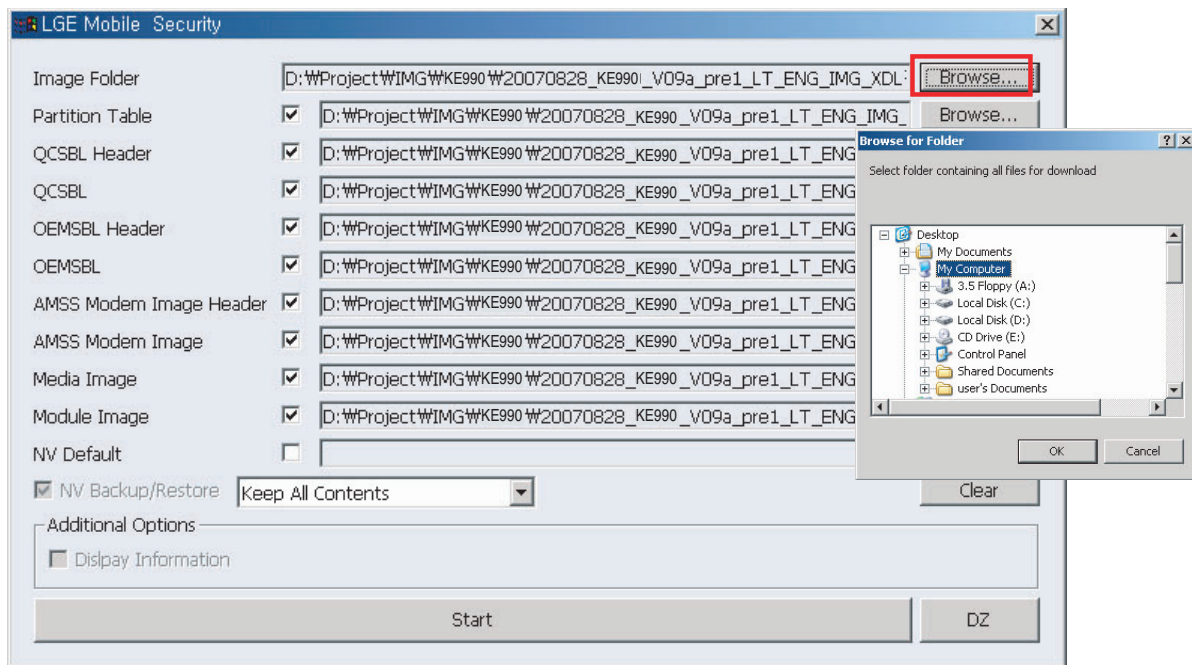
6) Clear: Clearing all directory paths of images in the dialog.

7) Start: Starting downloading the selected individual image.

5. DOWNLOAD

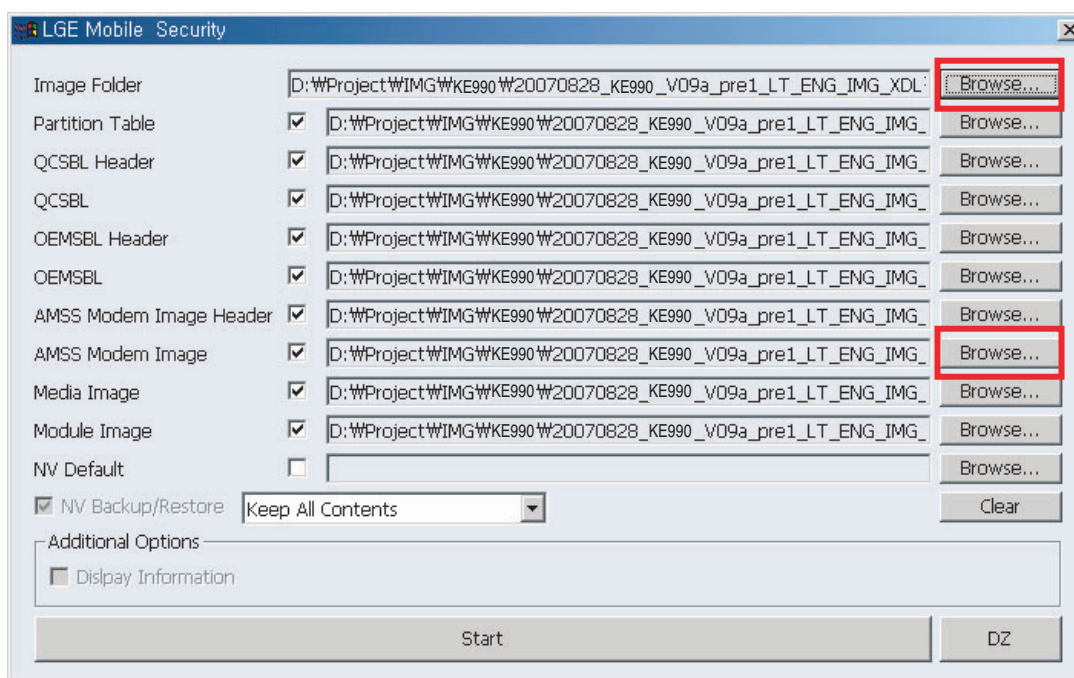
5.2.2 Choosing image files

- Select the image folder, where all the image files are located, by clicking on the Browse....
The folder name shall be different from that of the folder name in the snapshot. The folder name indicates the path where the image files are located.)



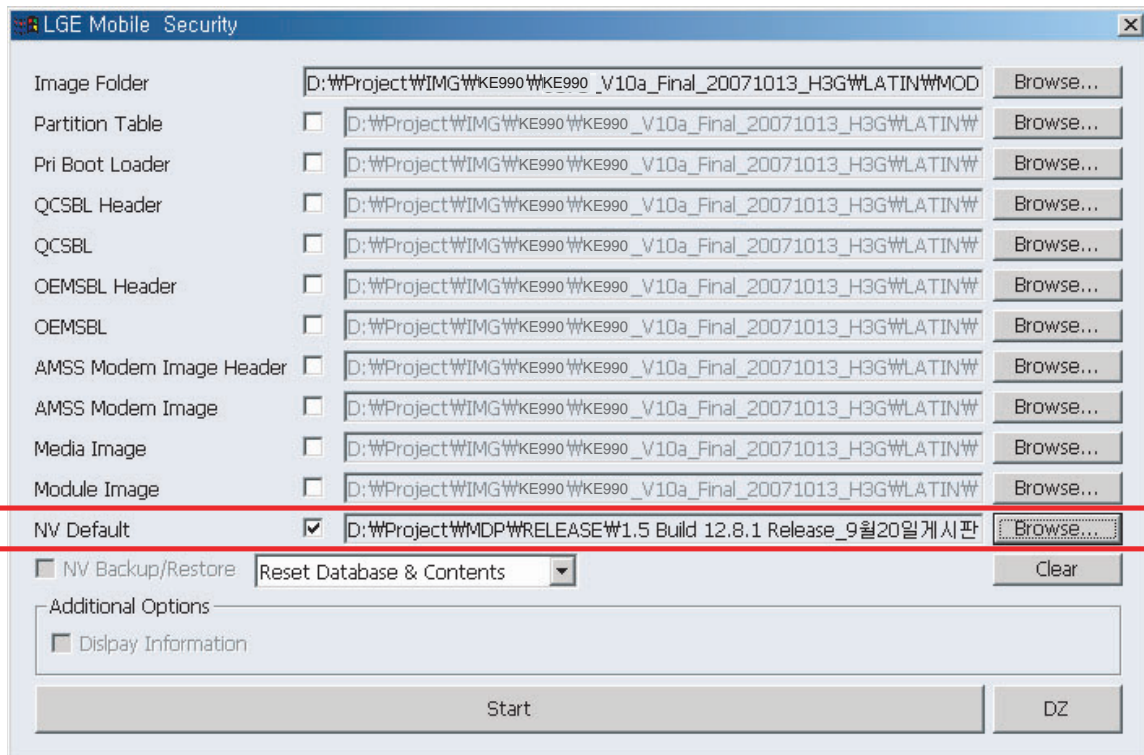
5. DOWNLOAD

Select the path on the Image Folder by clicking on the Browse..., then the LGMDP will automatically load images accordingly. Also you can select images by manually. For instance, select the path of AMSS Modem Image file by clicking on the Browse... button. The selected AMSS image will be downloaded to the handset from the path directory in the PC. Make sure that you have chosen correct file. In case of wrong AMSS Modem file is selected, the phone may not work. (The file name shall be different from that of the file name in the snapshot.)



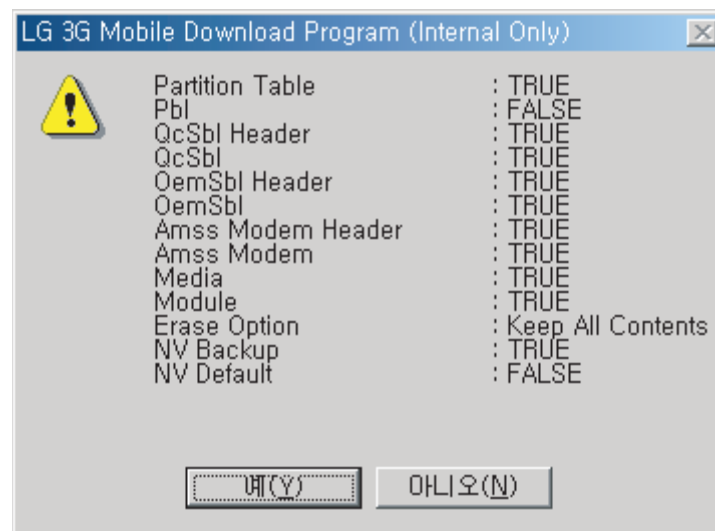
5. DOWNLOAD

- If NV restore is failed, then the NV Data(*.nv2) is erased permanently. In this case, choose the desired NV file to be downloaded on the handset. To enable this simply check the box or select the NV file from the LGMDP installation directory by clicking on the Browse... button.



5. DOWNLOAD

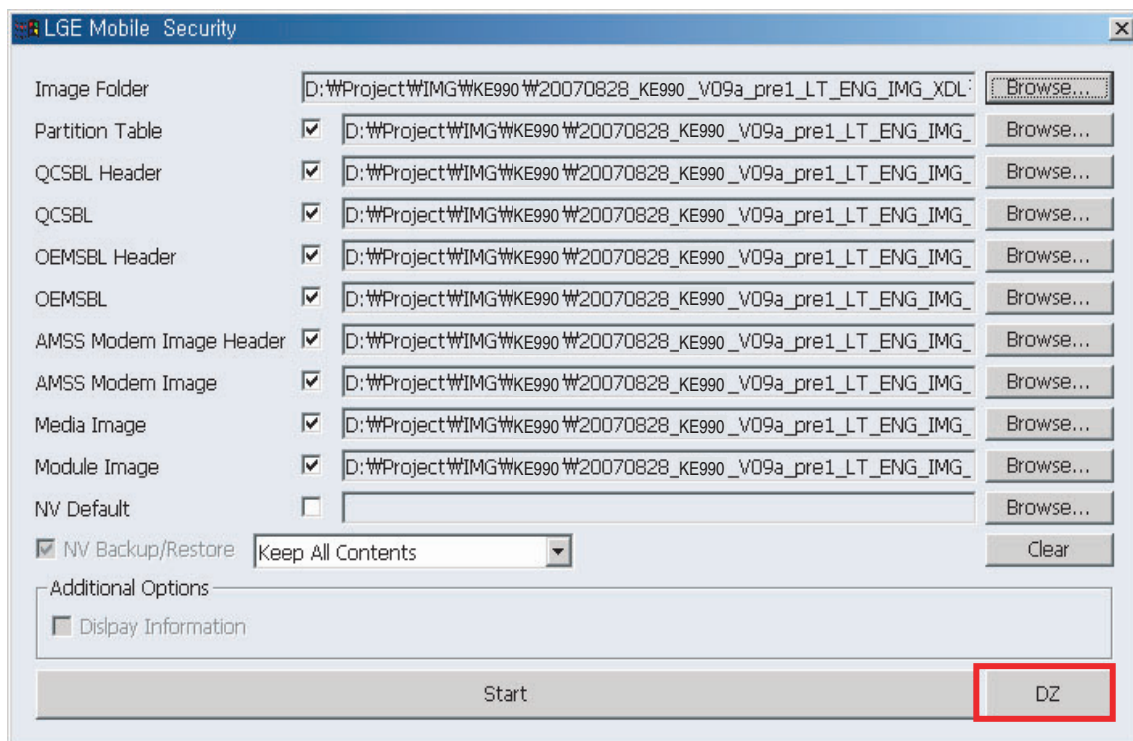
Click on the START button to start downloading. A summary of the selected images and option information window will be displayed. Click on the No button if this is not the setting you are downloading for. Otherwise click on the Yes button to continue downloading selected image file with options.



5. DOWNLOAD

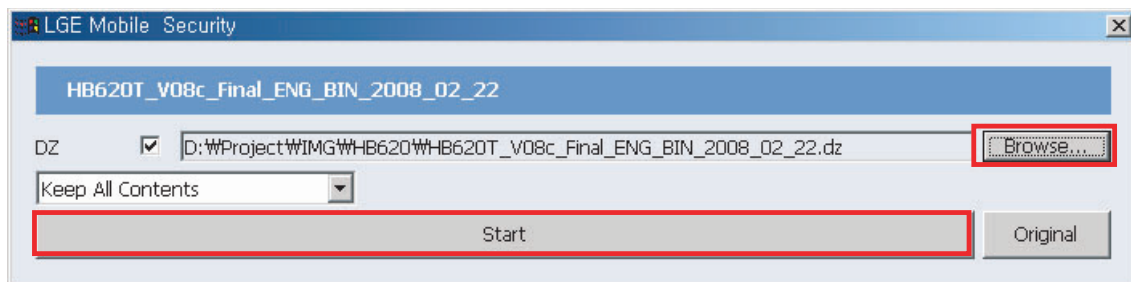
- DZ is one image S/W binary consisting of variety S/W images such as partition.mbn, pbl.mbn,..., module.bin. The new download function has been provided to allow the testing of the integrity of the DZ image by checking a hash code of every included file.

(DZ does not allow extracting or creating zip archive with other public opened archive tool such as WinZip or Alzip.) To download DZ image, simply click on the DZ button.



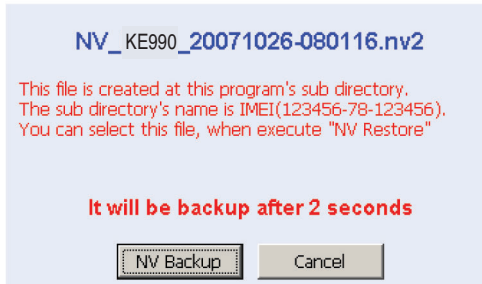
5. DOWNLOAD

- Select dz image path where dz image file is located by clicking on the Browse... button. Click on the Start Button to start downloading DZ image. If you want to go back to original download mode, click on the Original button.

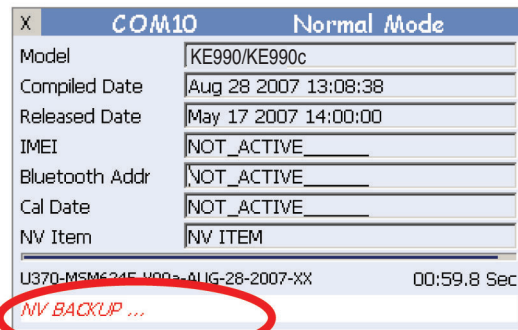


5. DOWNLOAD

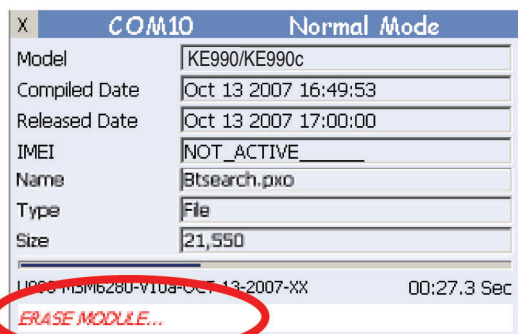
5.2.3 Downloading



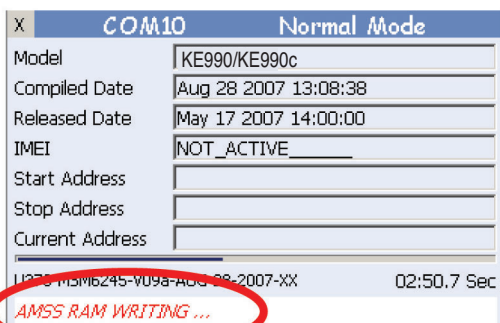
- This message box informs that a new file for NV backup will be created in the displayed file name in the LGMDP installation directory.



- Backing up NV data and backed up NV data will be stored in the LGMDP installation directory.

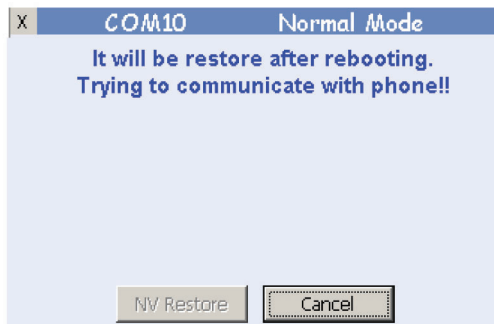


- Erasing the existing directories and files before the Module image is downloaded.

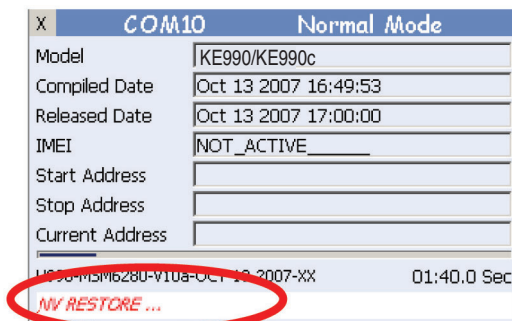


- Downloading the AMSS modem image

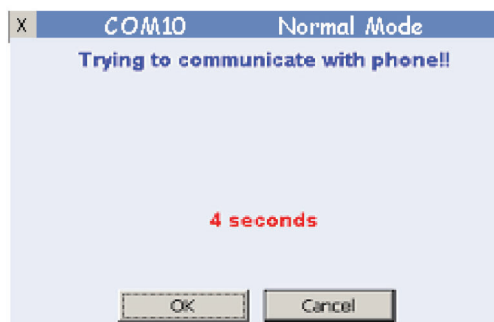
5. DOWNLOAD



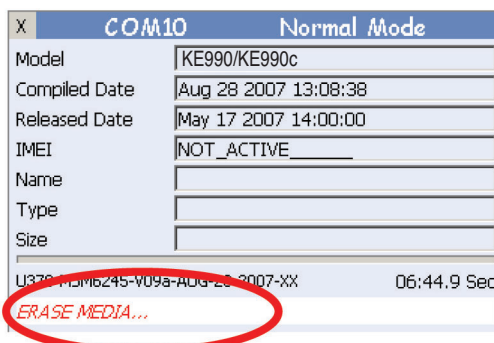
- Rebooting the handset and re-establishing the connection



- Restoring NV data which backed up in the Backing up process. User can also restore NV data using NV Default image selection.



- Rebooting the handset and re-establishing the connection



- Erasing the existing directories and files before downloading the selected Media image

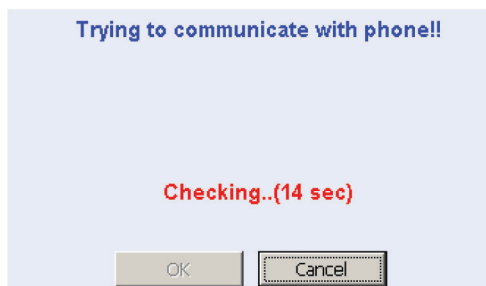
5. DOWNLOAD

X	COM10	Normal Mode
Model	KE990/KE990c	
Compiled Date	Aug 28 2007 13:08:38	
Released Date	May 17 2007 14:00:00	
IMEI	NOT_ACTIVE	
Name	Shirt_16.bin.gz	
Type	File	
Size	3,967/3,967	
U370-M5M0219-V090-A05-28-2007-XX		08:05.6 Sec
MEDIA DOWNLOADING ...		

- Downloading Media image in progress

X	COM10	Normal Mode
Model	KE990/KE990c	
Compiled Date	Aug 28 2007 13:08:38	
Released Date	May 17 2007 14:00:00	
IMEI	NOT_ACTIVE	
Name	FileManager.pxo	
Type	File	
Size	299,008/509,358	
U370-M5M0245-V090-A05-28-2007-XX		12:46.5 Sec
MODULE DOWNLOADING ...		

- Downloading Module image in progress



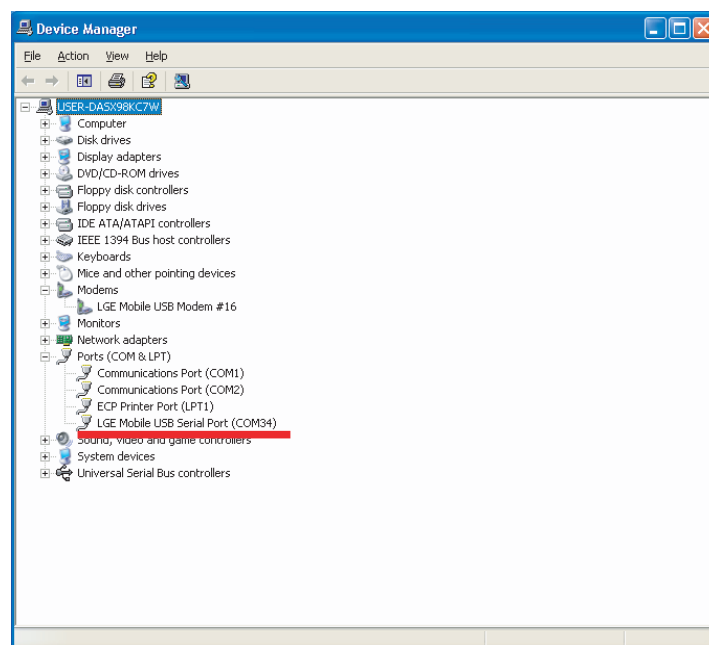
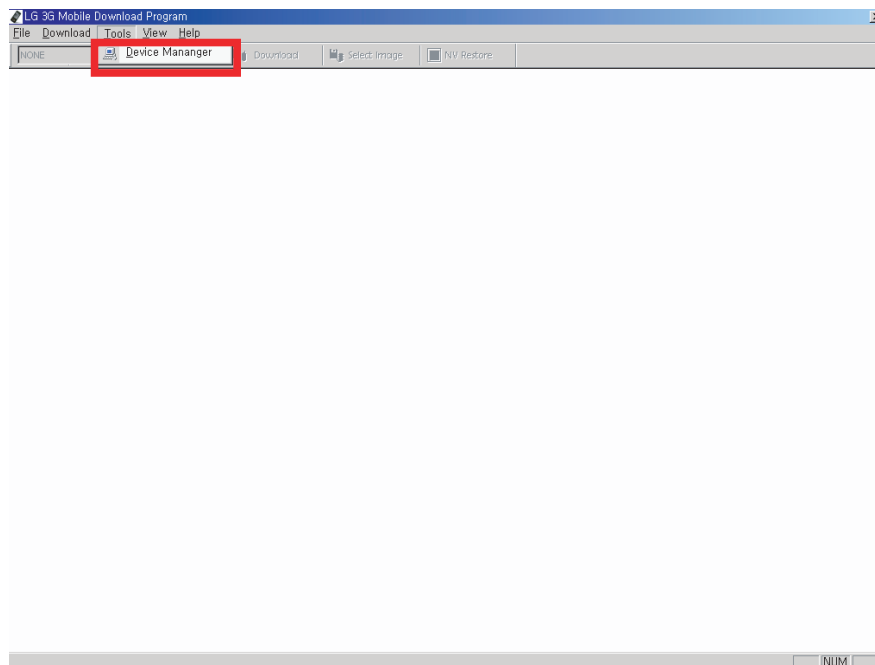
- Rebooting handset

X	COM10	Download End
Model	KE990/KE990c	
Compiled Date	Oct 13 2007 16:49:53	
Released Date	Oct 13 2007 17:00:00	
IMEI	NOT_ACTIVE	
Bluetooth Addr	NOT_ACTIVE	
Cal Date	NOT_ACTIVE	
Current Address		
U990-M5M0200-V100-A05-13-2007-XX		16:13.3 Sec
Download Completed!		

- Downloading process has completed successfully

5.2.4 Tools

- Device Manager allows to monitor current hardware that is installed on your PC. Device Manager is designed to monitor USB connectivity and check where the COM has been installed . Select Device Manager from the Tools of the file menu.



5. DOWNLOAD

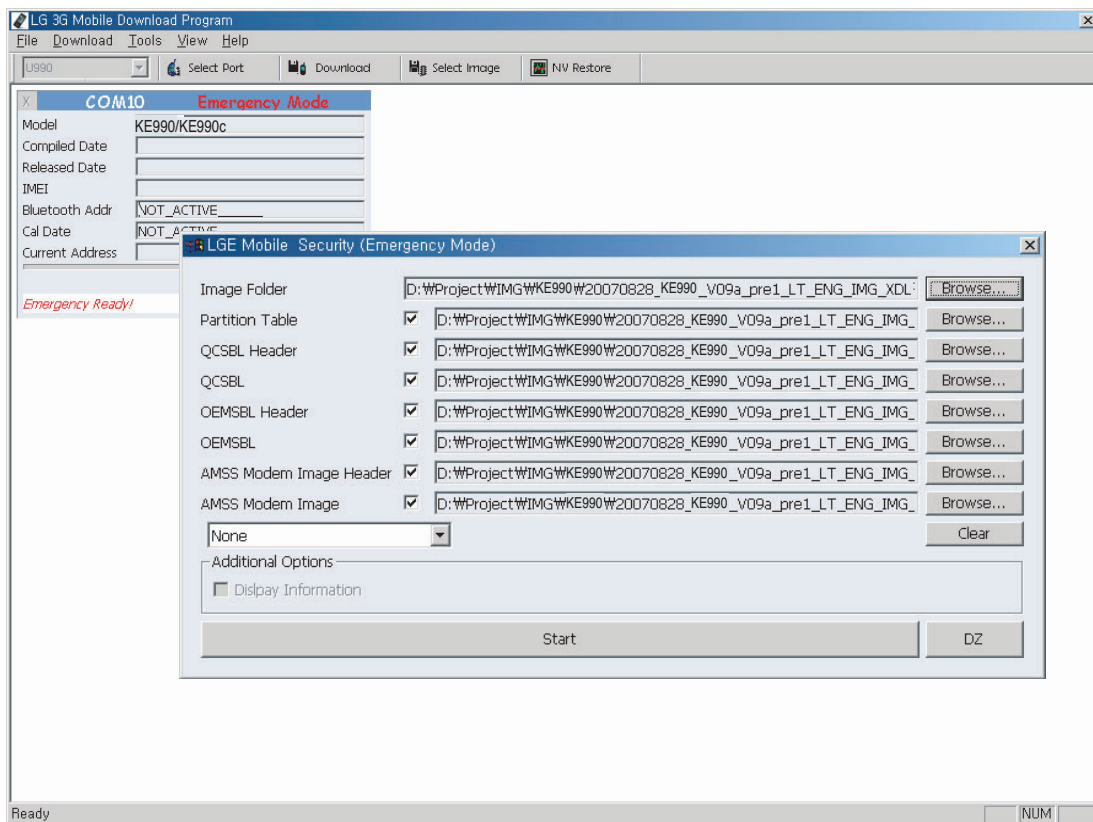
5.3 Troubleshooting Download Errors

5.3.1 When the phone does not work

- Reboot the phone in the emergency mode (Simultaneously press 2, 5, and PWR red keys) and then try to download all the images up to AMSS. In the emergency mode, you can not download media or module image.

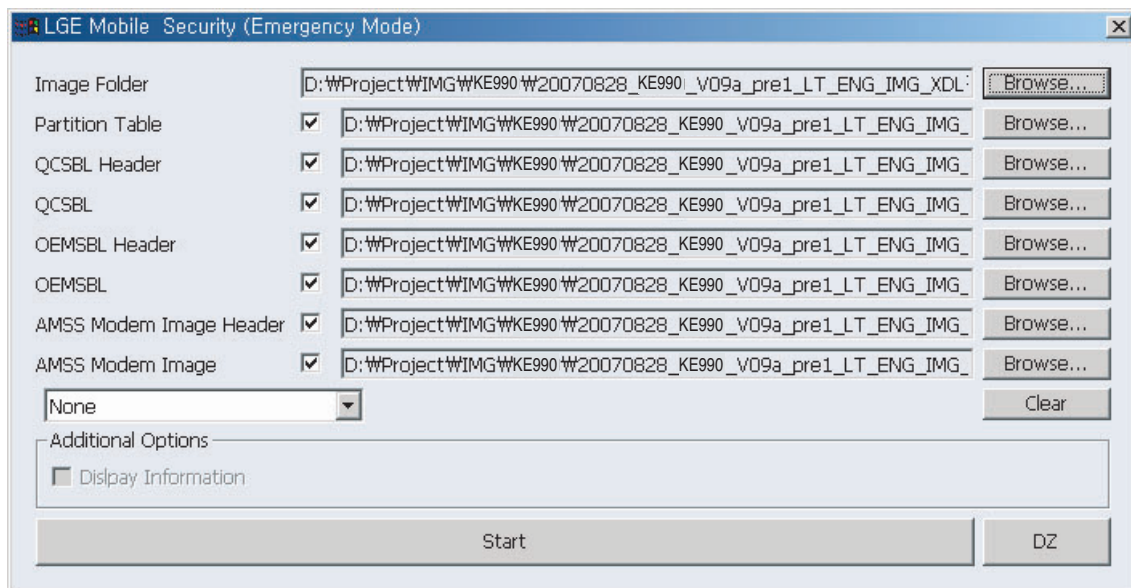
The phone supports a special mode called emergency mode. In this mode, minimum units for downloading is running so that users can download the images again in case of emergency situation. (AMSS modem, Media, and Module images can not be running in this mode.)

- The below dialog shows parameters of Select Port when phone is booted in Emergency mode. Click on the Connect button to continue.



5. DOWNLOAD

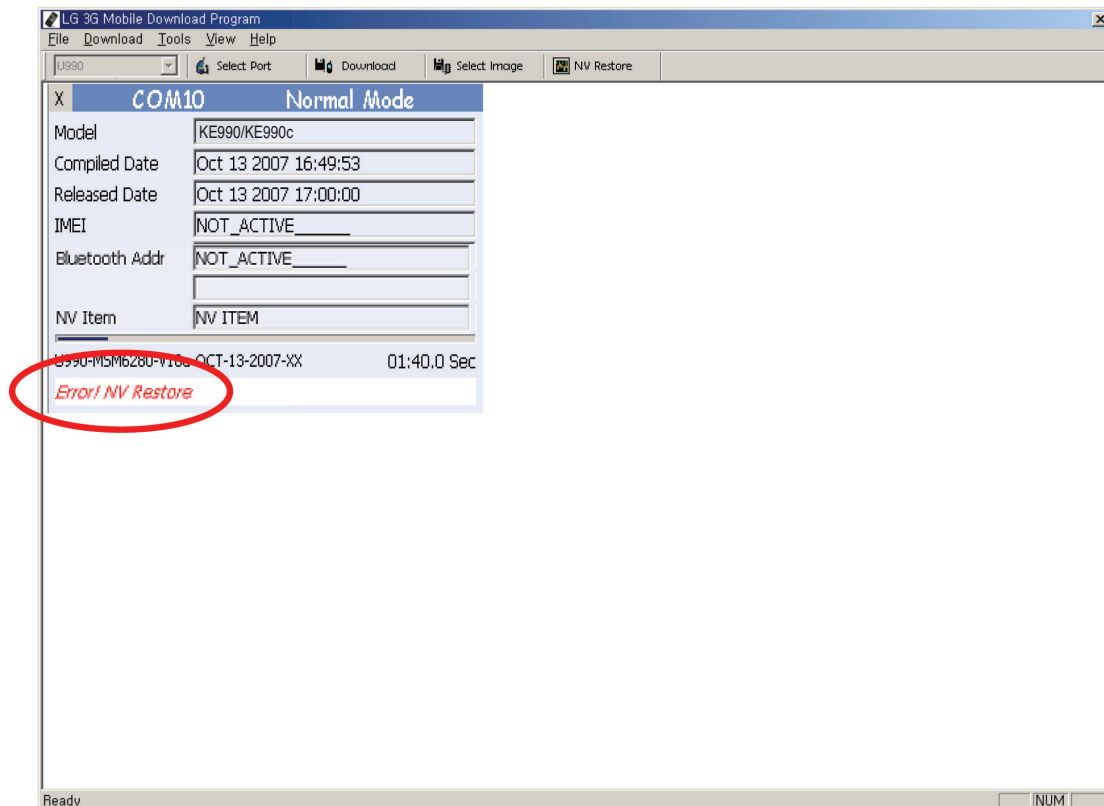
- Choose Image file after clicking on the Browse... button. Make sure that you have chosen the right image file. After choosing valid images, then click on the Start button to start downloading selected images. The selected image will be downloaded to the handset from the path directory in the PC. After downloading images successfully, it will boot to normal mode.



5. DOWNLOAD

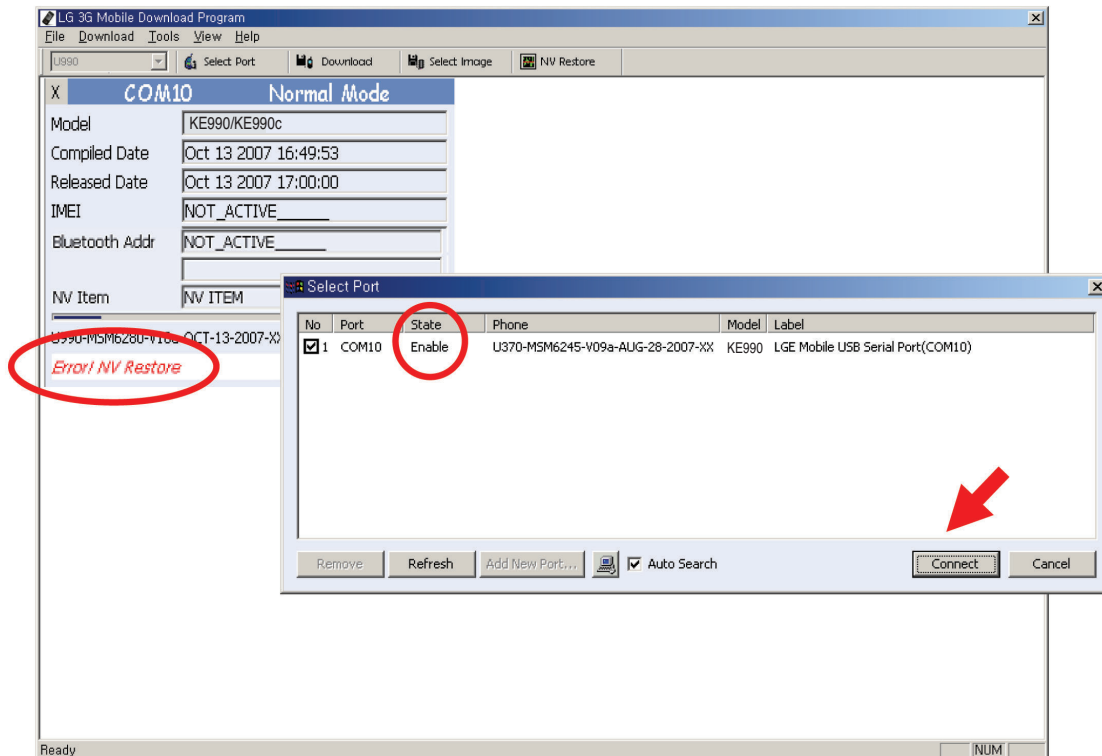
5.3.2 NV Restore Error

- Snapshot showing the NV Restore error. Next slide shows the remedial procedure to adopt.



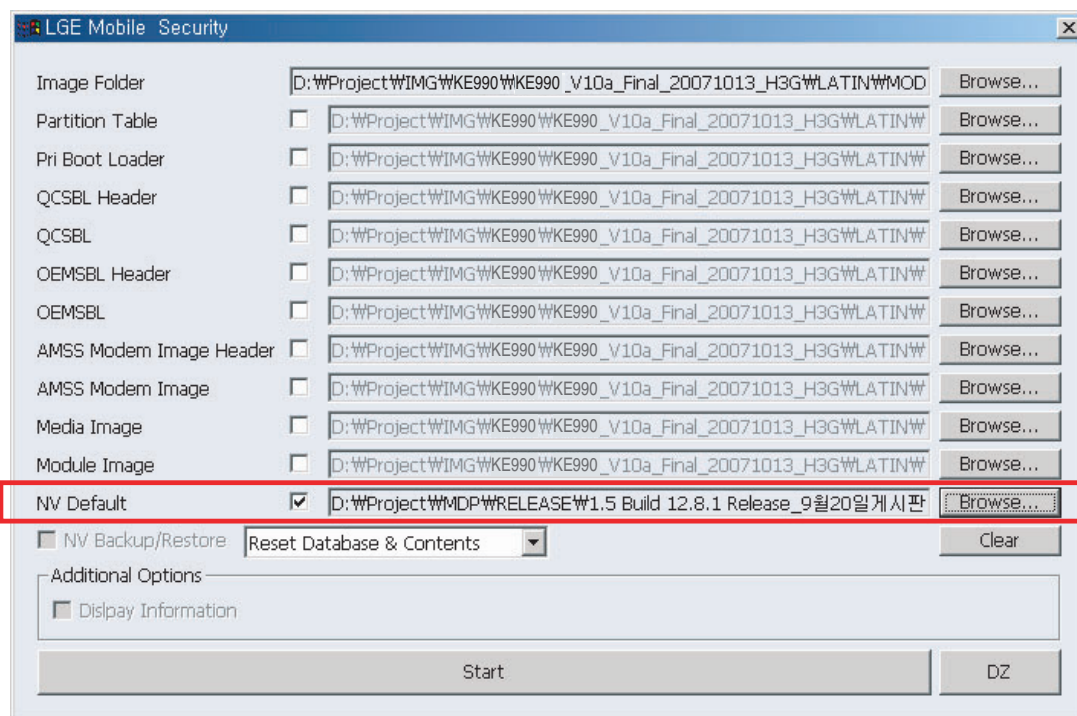
5. DOWNLOAD

- Connect the handset and Press the Connect button in the Select Port window.
(Enable state in the window indicates that the Phone has been detected and is ready to download.)



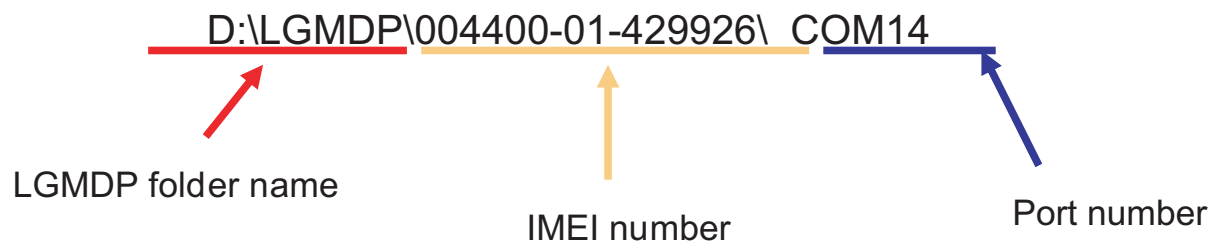
5. DOWNLOAD

- Click on Browse... . Select the LGMDP installation directory and a list of NV Backup files(*.nv2) will be shown. These nv files were saved every time NV Backup option was selected, and the name of the nv file is determined based on the time when NV Backup was done. Choose the desired NV file to be downloaded on the handset, and click on Start.



5.4 Caution

- 1) Multi-downloading using the USB hub is not recommendable.
- 2) If you see the message 'cal mode' after 'completing download', you must do NV restore and image (media and module) download.
- 3) The NV data saved at LGMDP folder as following format.

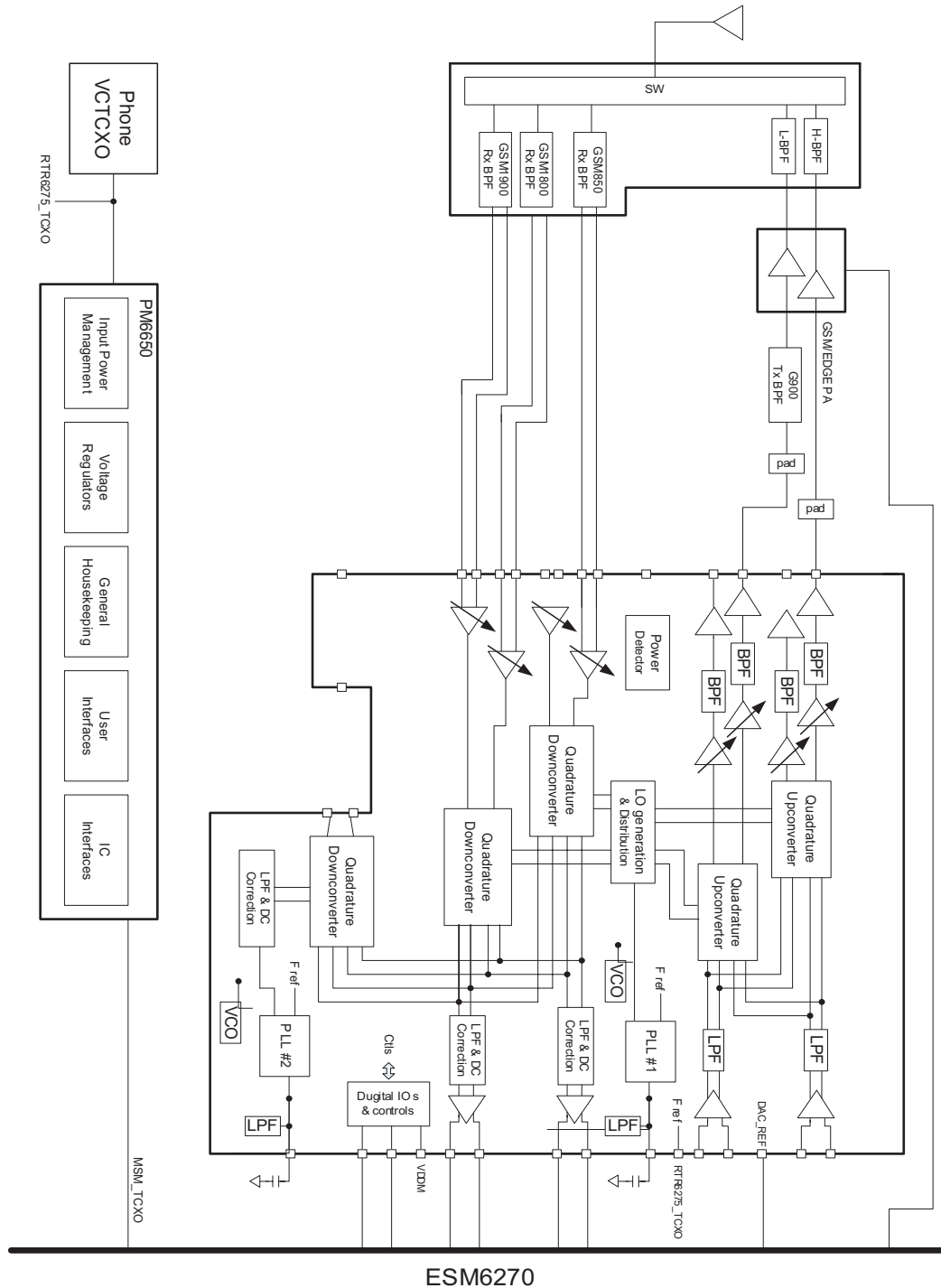


- 4) Recommended that the Module and Media Image have to be downloaded at the same time.
- 5) Erase EFS option will erase everything (media, module, nv items, and user data) in the EFS area.

6. BLOCK DIAGRAM

6. BLOCK DIAGRAM

6.1 GSM RF Block



[Figure 2.1] EGSM-900/DCS-1800/PCS-1900 RF Functional Block Diagram

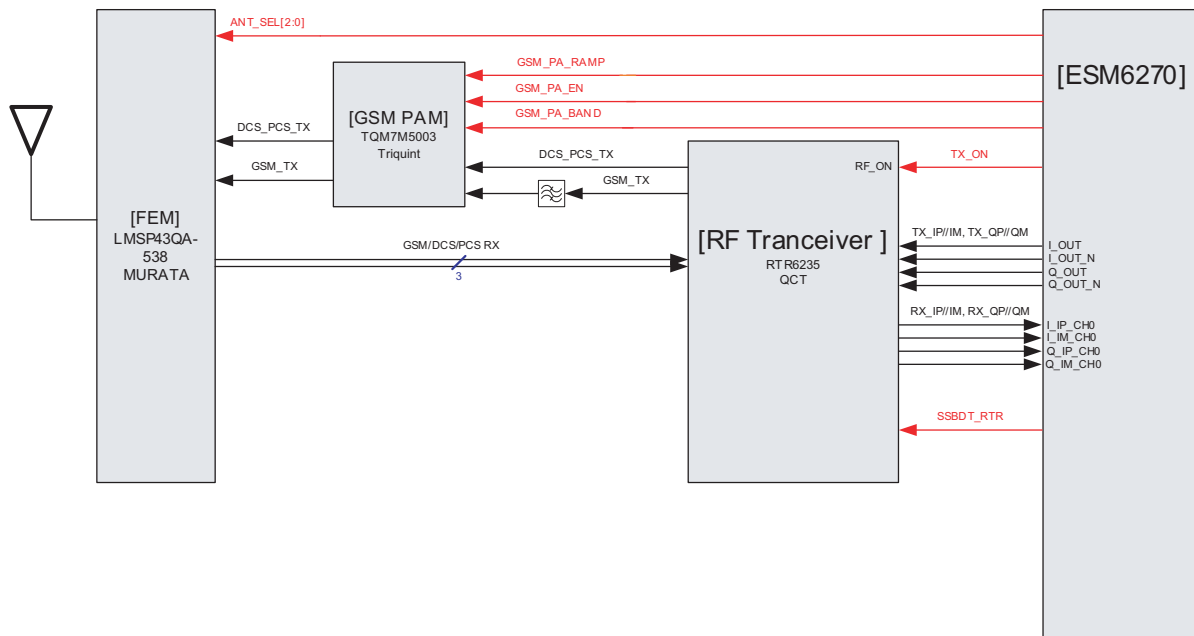
6. BLOCK DIAGRAM

Block	Ref. Name	Part Name	Function	Comment
Common	FL100	LMSP43QA-538	Front End Module	ASM+Rx Saw
	SW100	KMS518	Test Connector	Calibration, etc
	X100	TG-5010LH_19_2M	VCTCXO	19.2MHz
	U100	RTR6235	RF Transceiver IC	TRX
Bluetooth	M800	LBRQ-2B43A	BT RF Tran sceiver	BT TRX
GSM	U101	TQM7M5003	TX Dual PAM	TX
	FL101	EFCH897MTDB1	Tx SAW Filter	Tx

[Table 2.1] RF Block Component

6. BLOCK DIAGRAM

6.2 Interface Diagram



[Figure 2.2] KE990/KE990c Interface Diagram

6. BLOCK DIAGRAM

Main RF signal

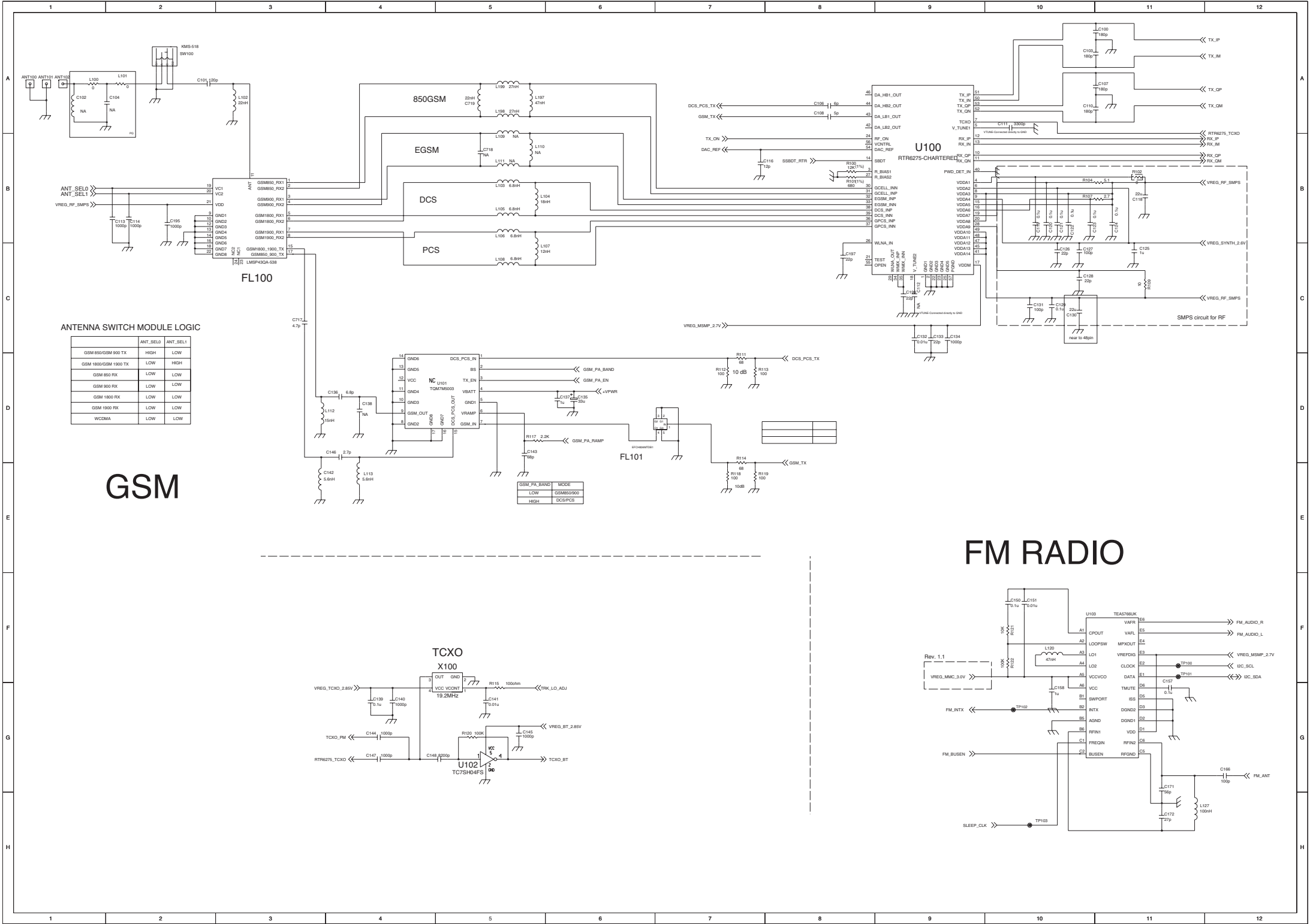
Main RF signal	Description	Comment
GSM 850 TX	GSM 850 TX RF Signal	
DCS TX	DCS TX RF Signal	
PCS TX	PCS TX RF Signal	
GSM 850 RX	GSM 850 RX RF Signal	
DCS RX	DCS RX RF Signal	
PCS RX	PCS RX RF Signal	
TX_I/Q	I/Q for Tx of RF	
RX_I/Q	I/Q for Rx of RF	

Control signal

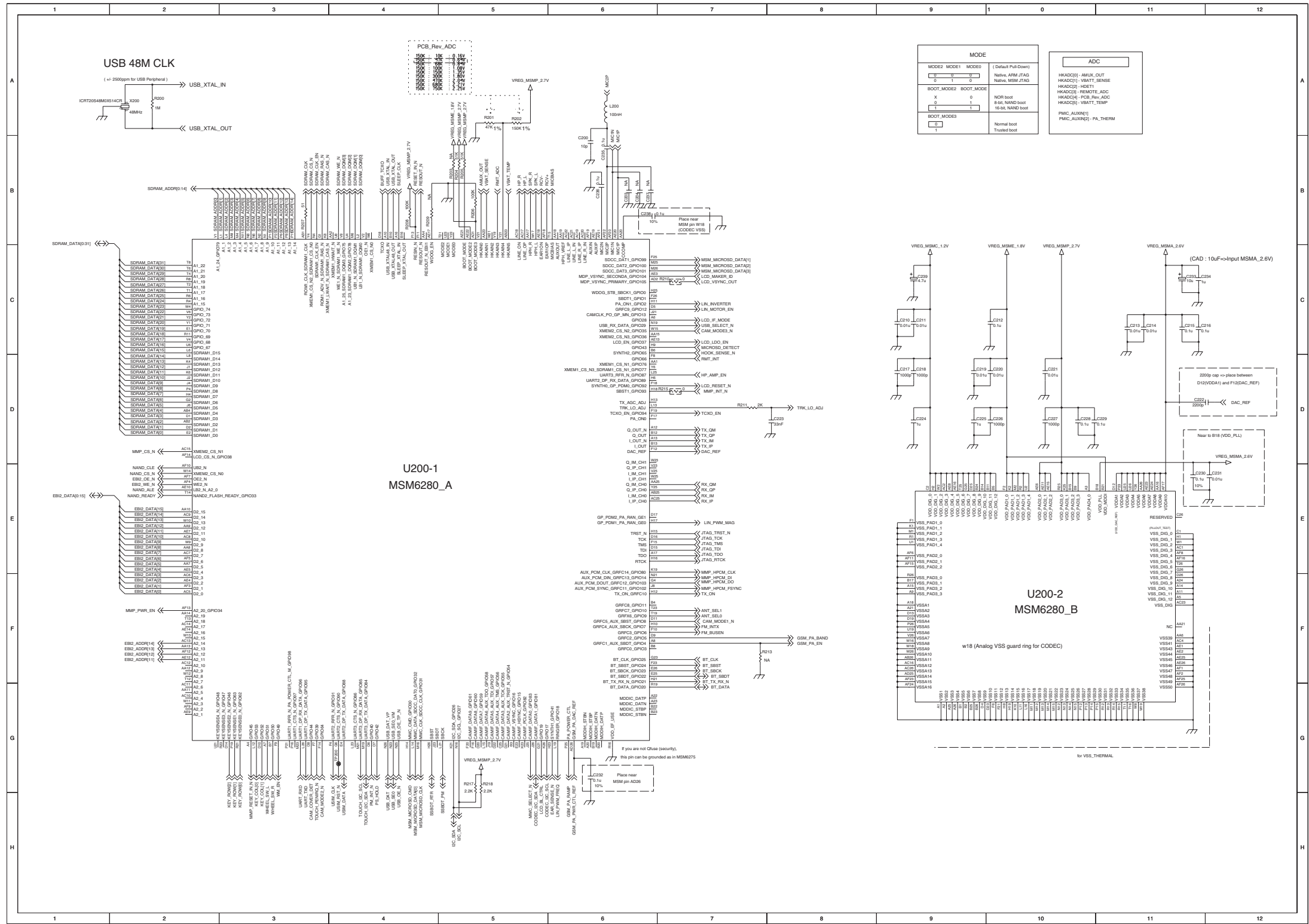
Control signal	Description	Comment
GSM_PA_CTL signal		
GSM_PA_BAND	DCS or PCS /GSM Mode Selection	
GSM_PA_EN	Power Amp. Gain Control Enable	
GSM_PA_RAMP	Power Amp. Gain Control	
RF Tranceiver_CTL signal		
TX_ON	RF Enable Signal	
SSBDT_RTR	Bidirectional SSBI Data	
FEM_CTL signal		
ANT_SEL 0,1,2	Ant Switch Module Mode Selection	GSM850Tx/Rx, DCS Tx/Rx, PCS Tx/Rx



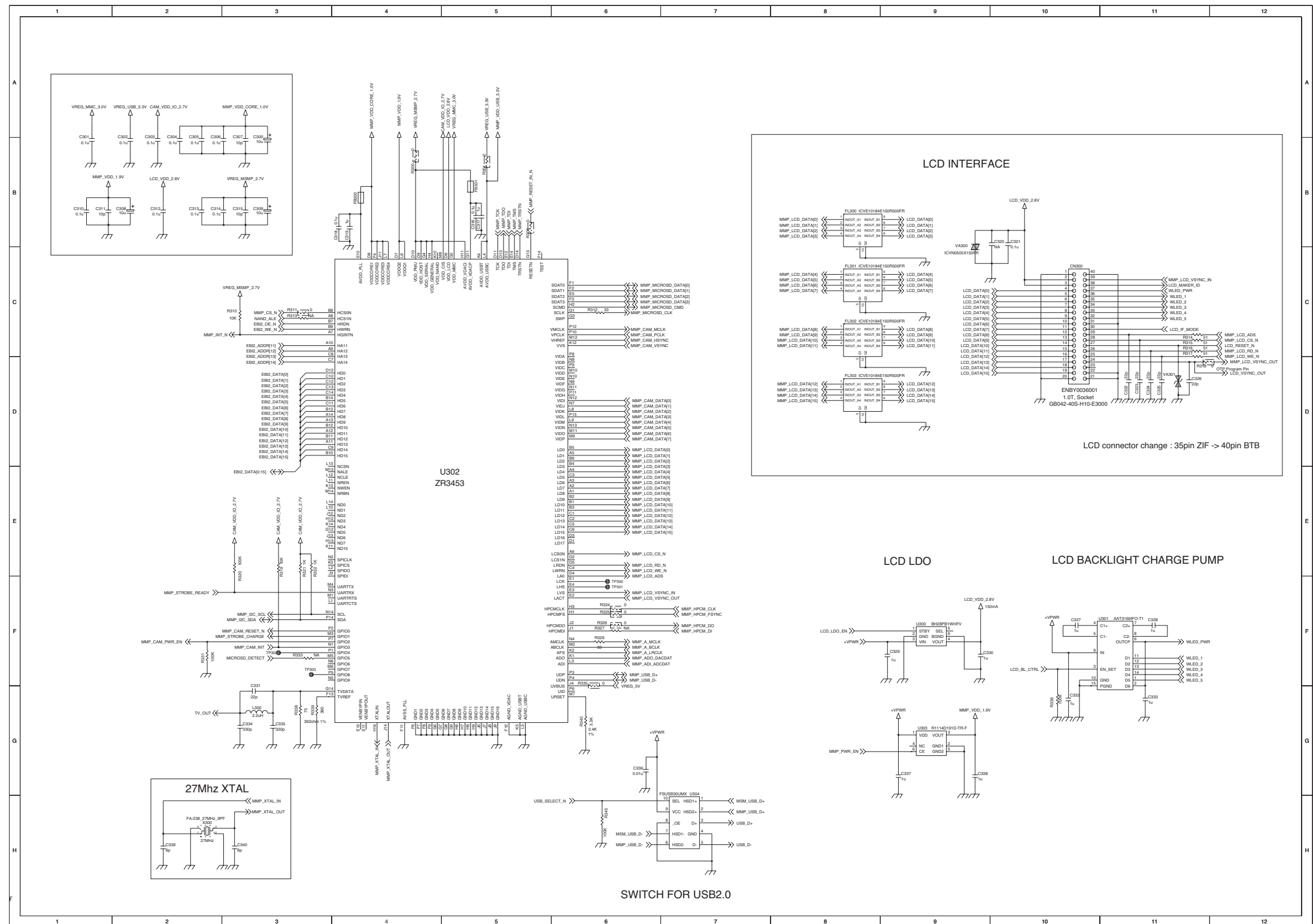
7. CIRCUIT DIAGRAM



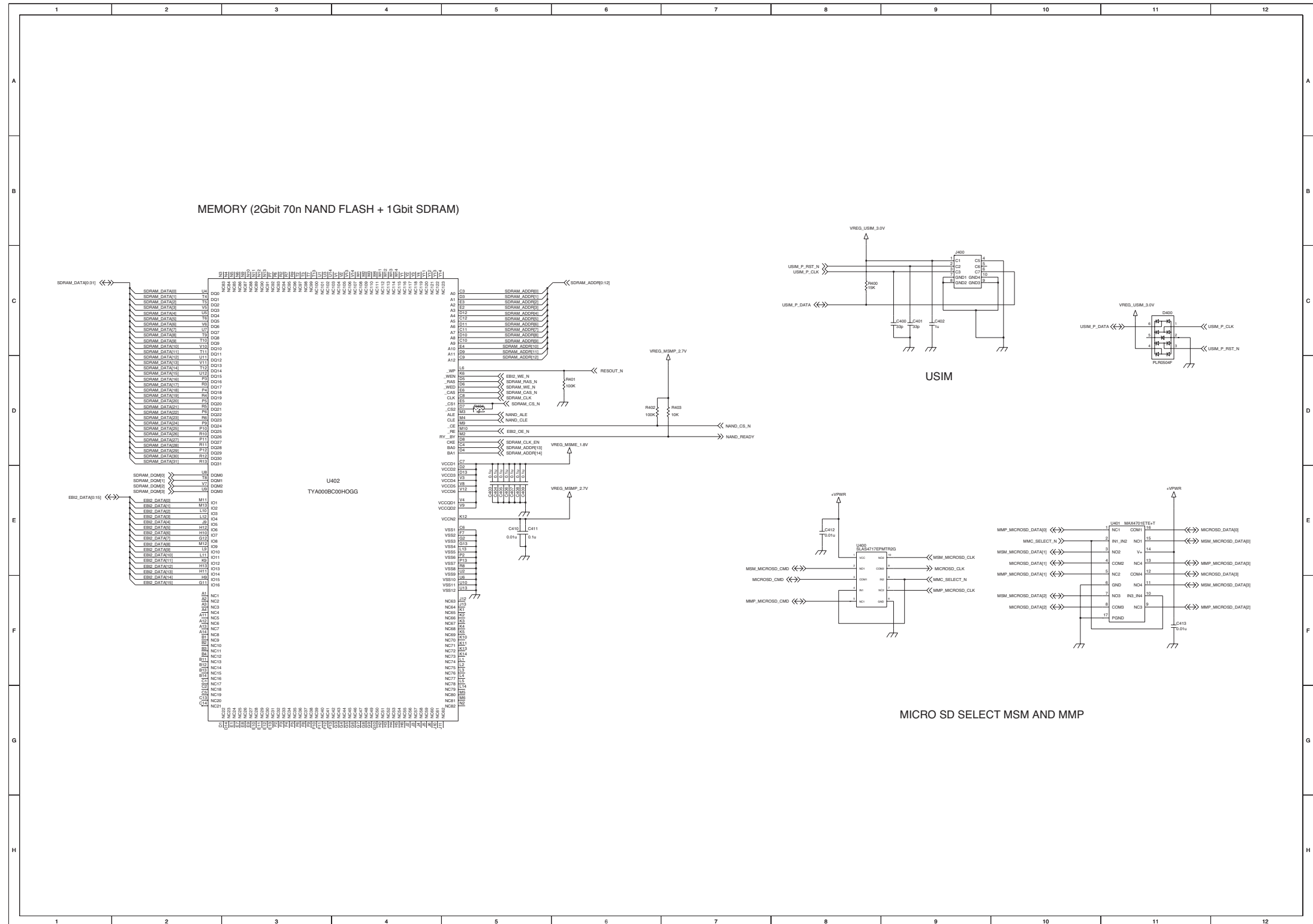
7. CIRCUIT DIAGRAM



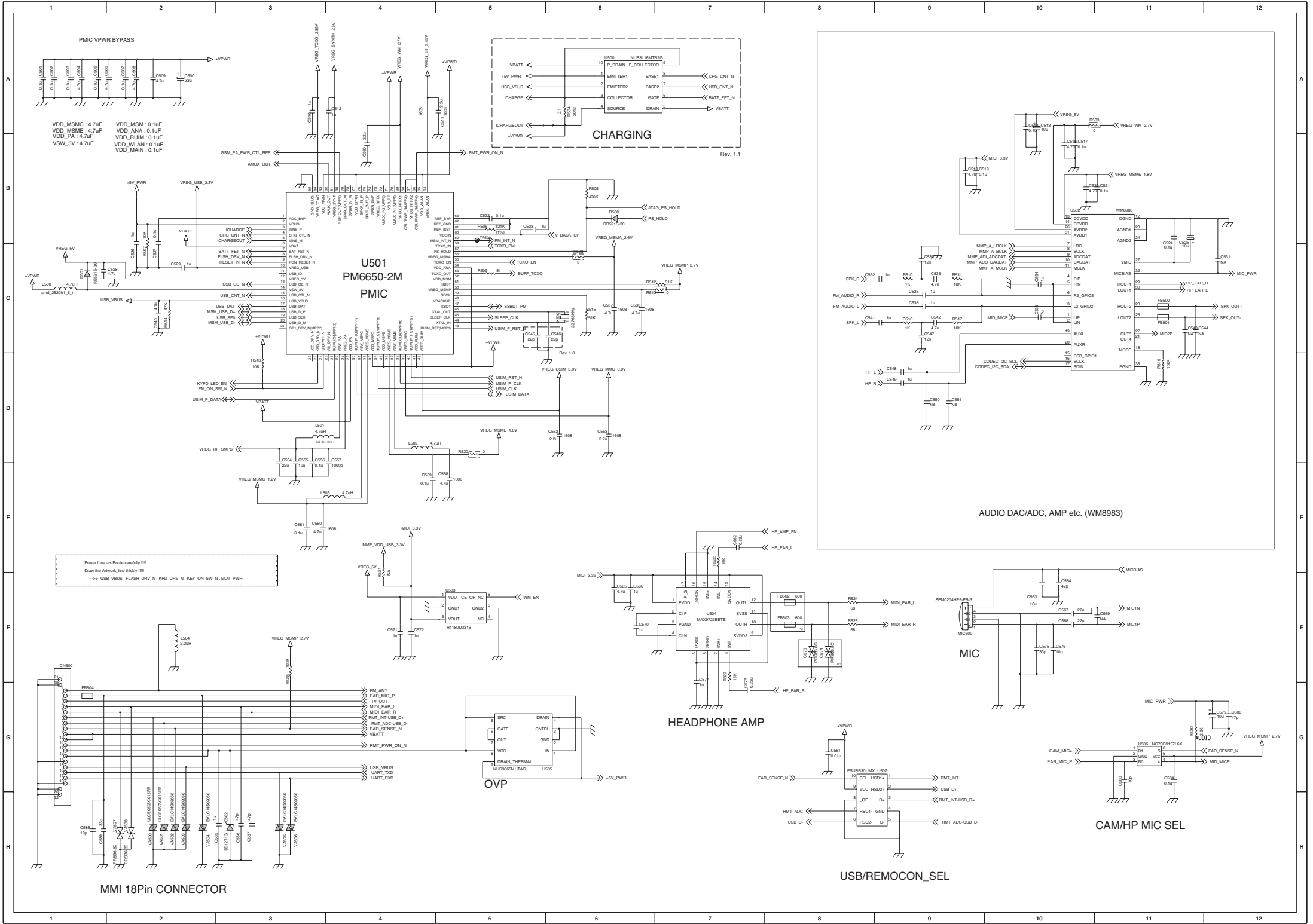
7. CIRCUIT DIAGRAM



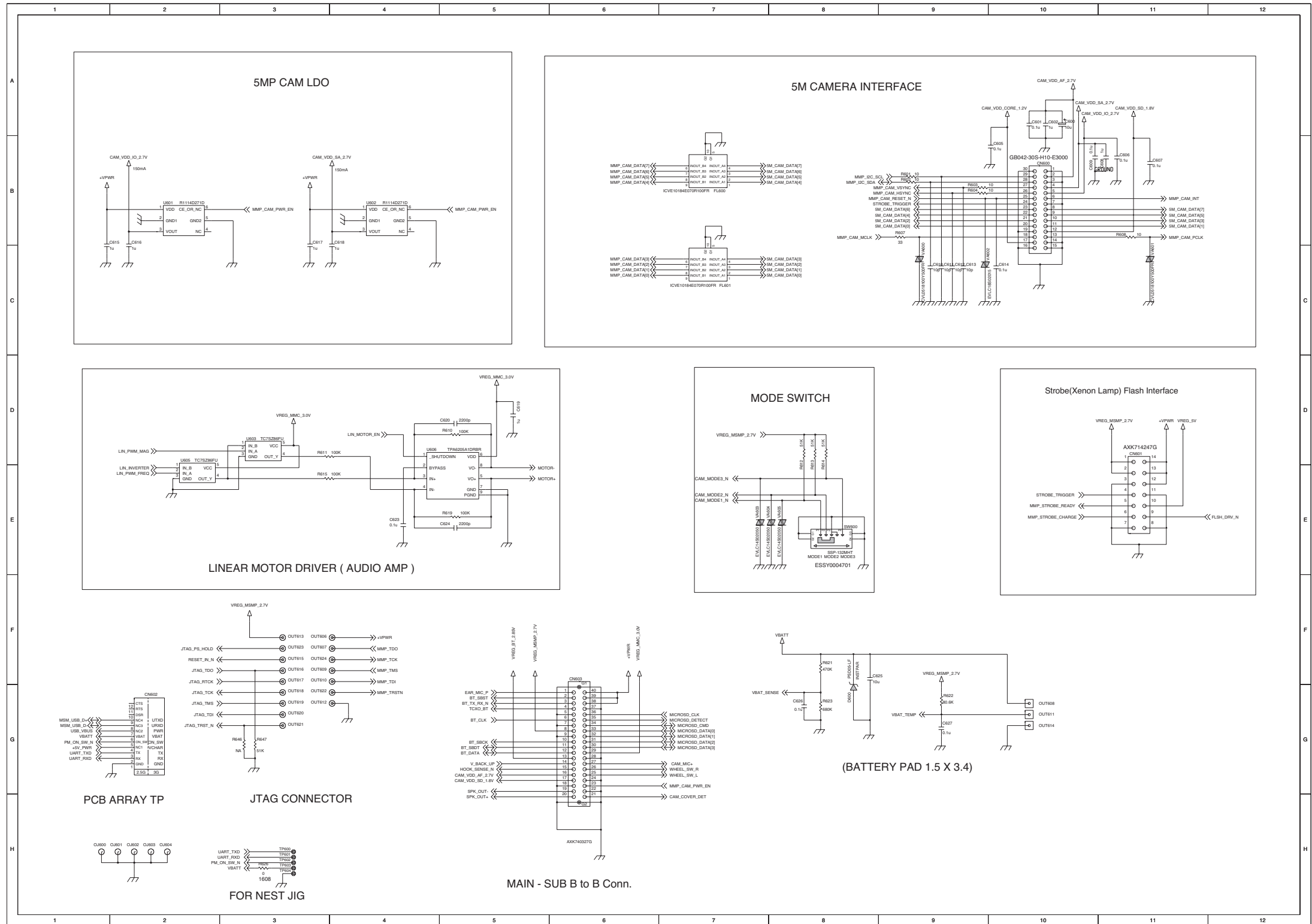
7. CIRCUIT DIAGRAM



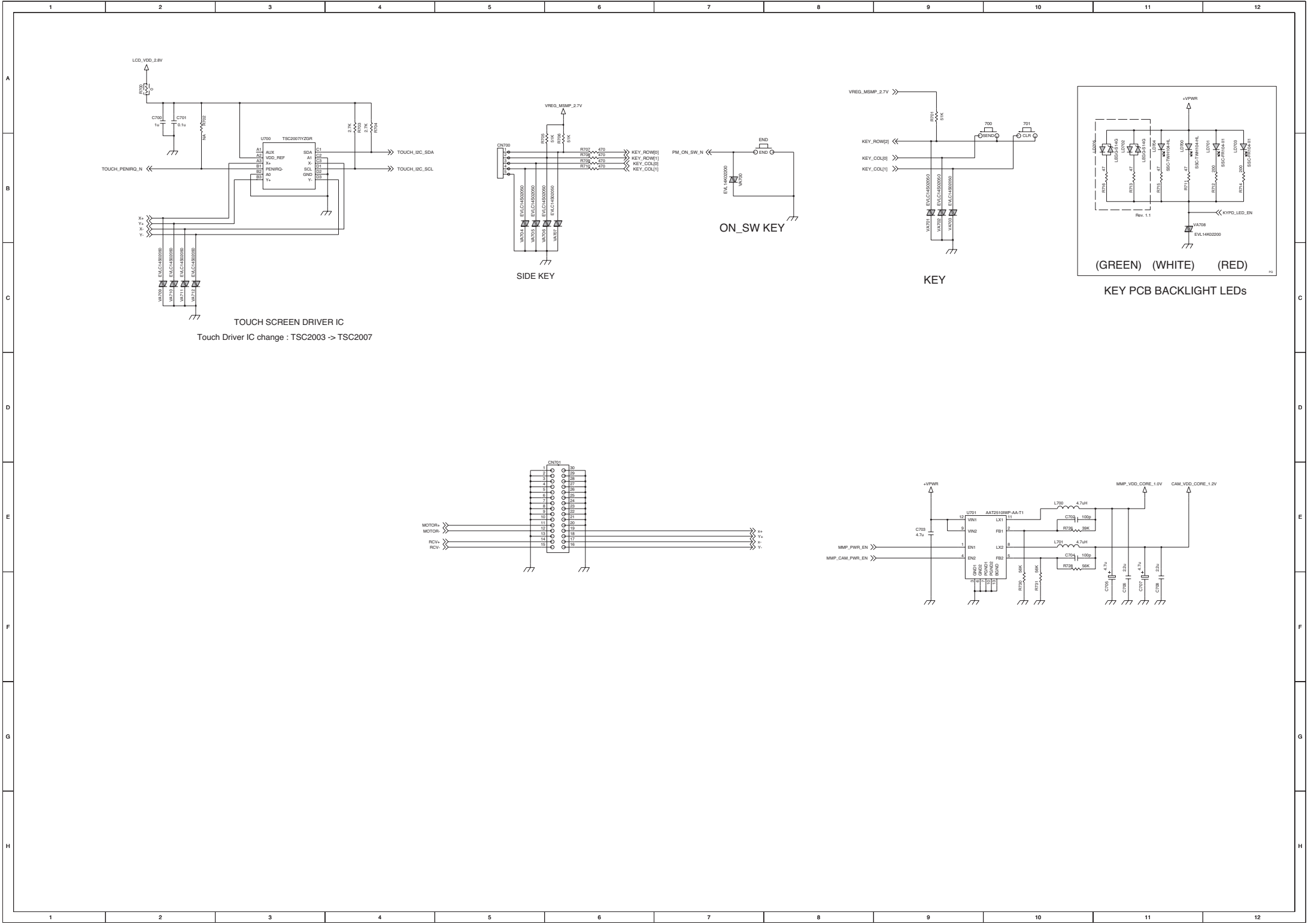
7. CIRCUIT DIAGRAM



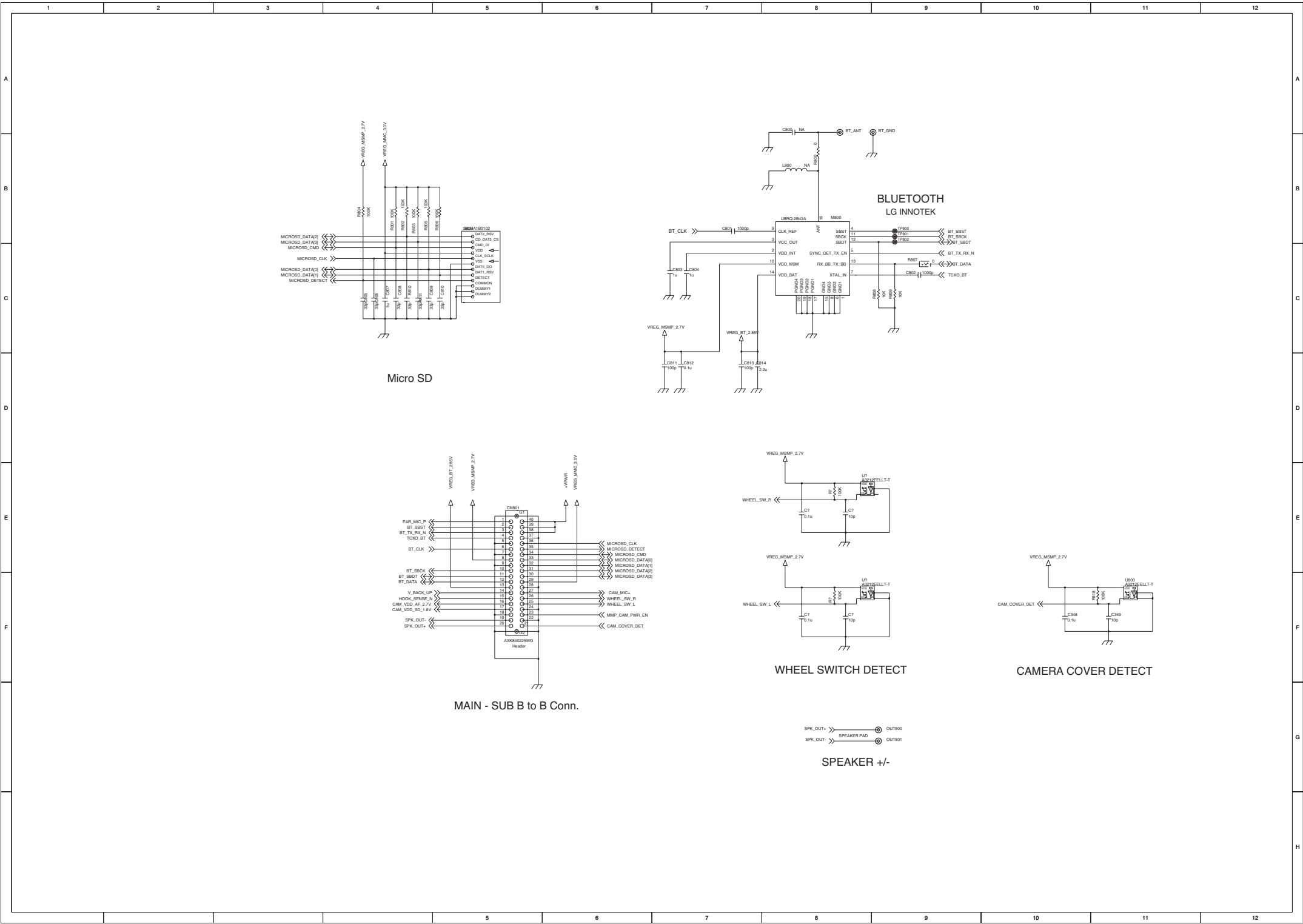
7. CIRCUIT DIAGRAM



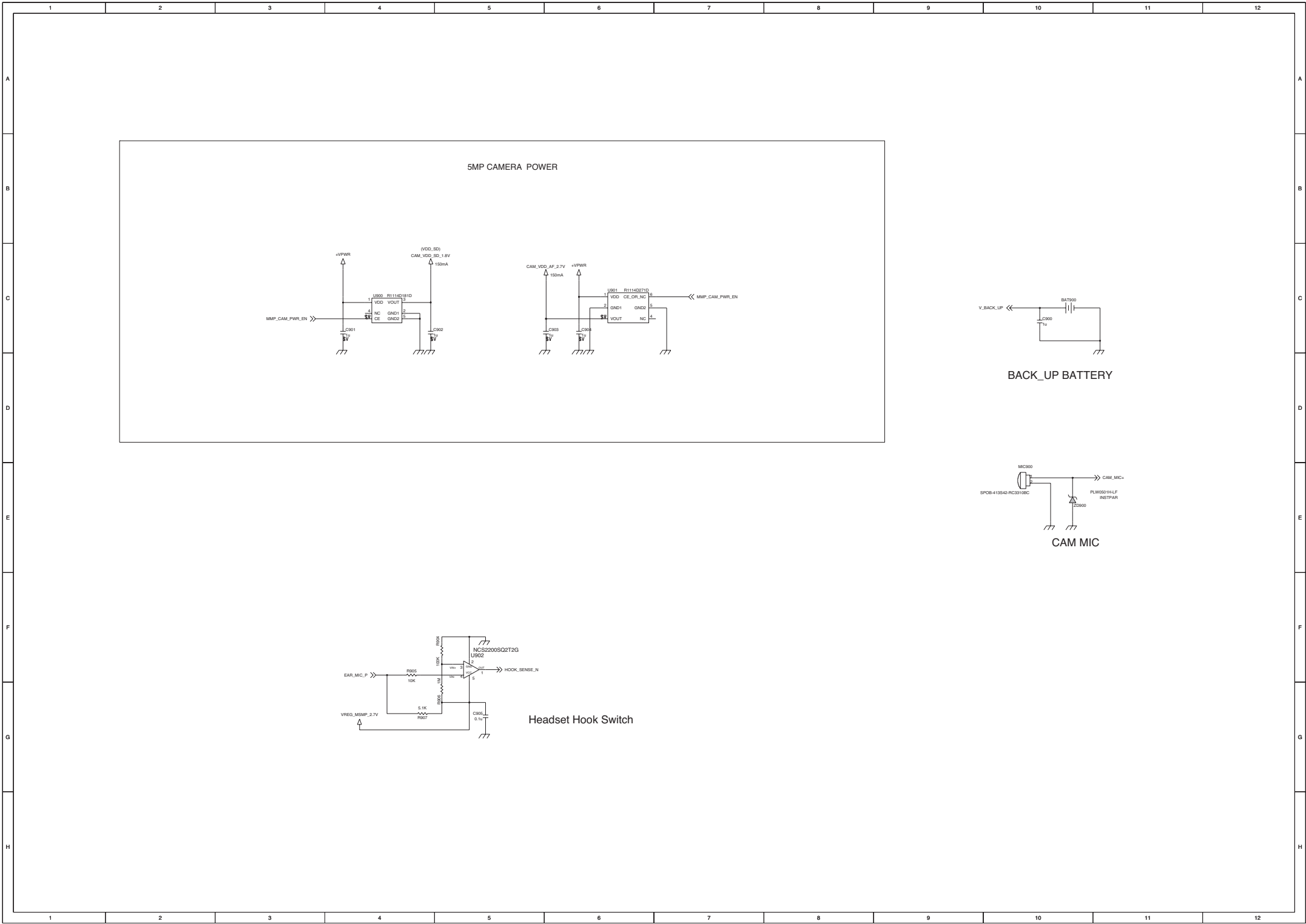
7. CIRCUIT DIAGRAM



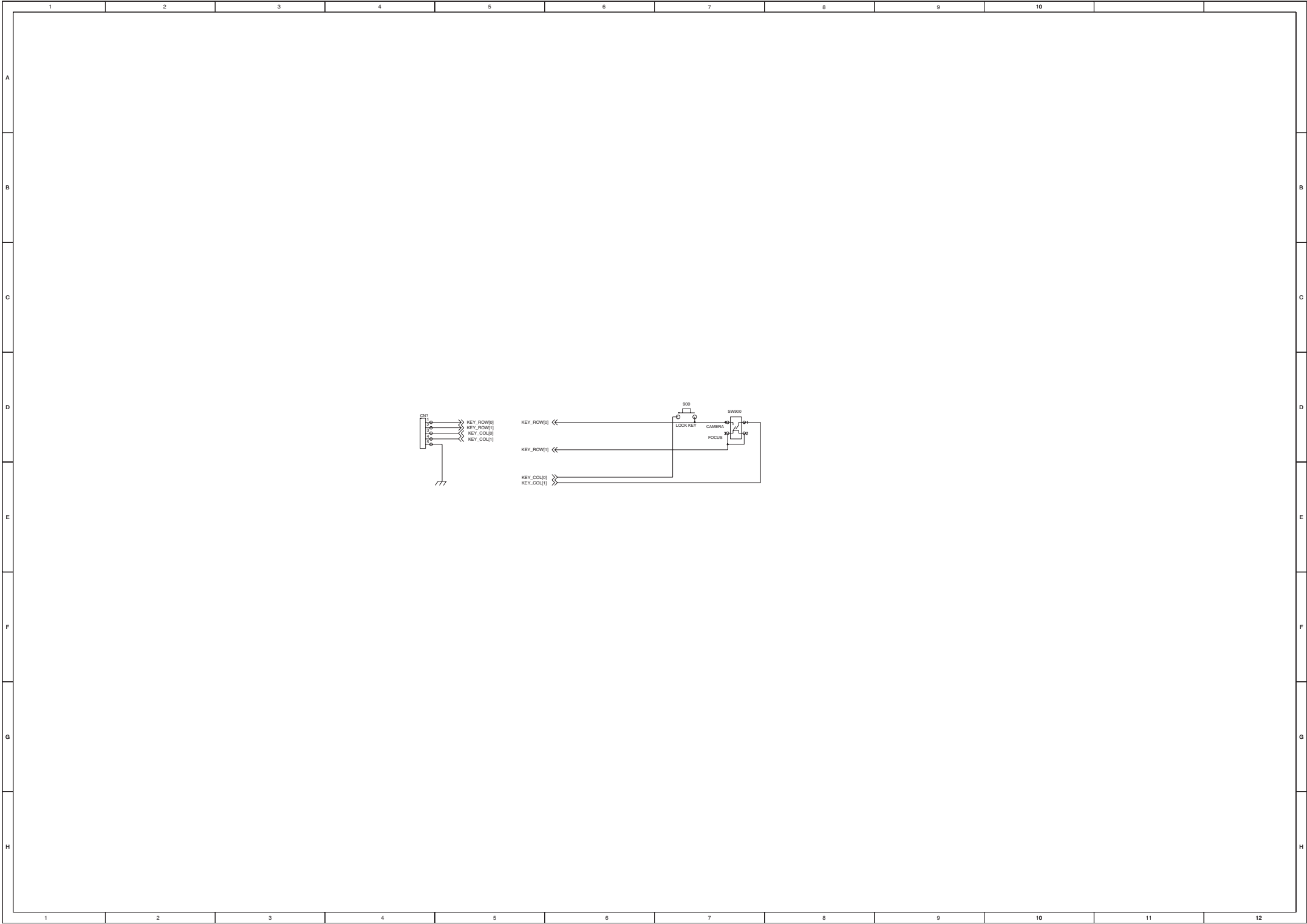
7. CIRCUIT DIAGRAM



7. CIRCUIT DIAGRAM

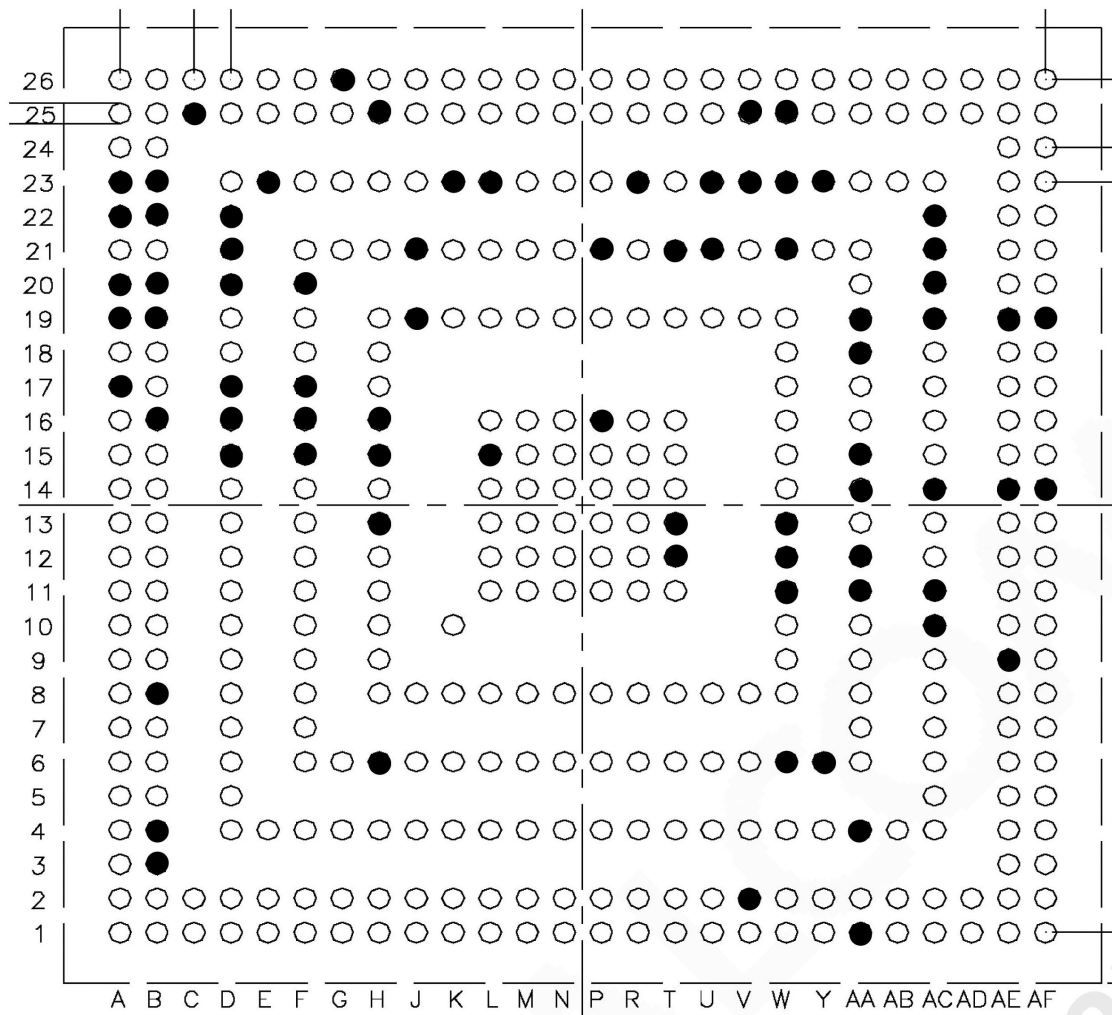


7. CIRCUIT DIAGRAM



8. BGM Pin Map

ESM6270

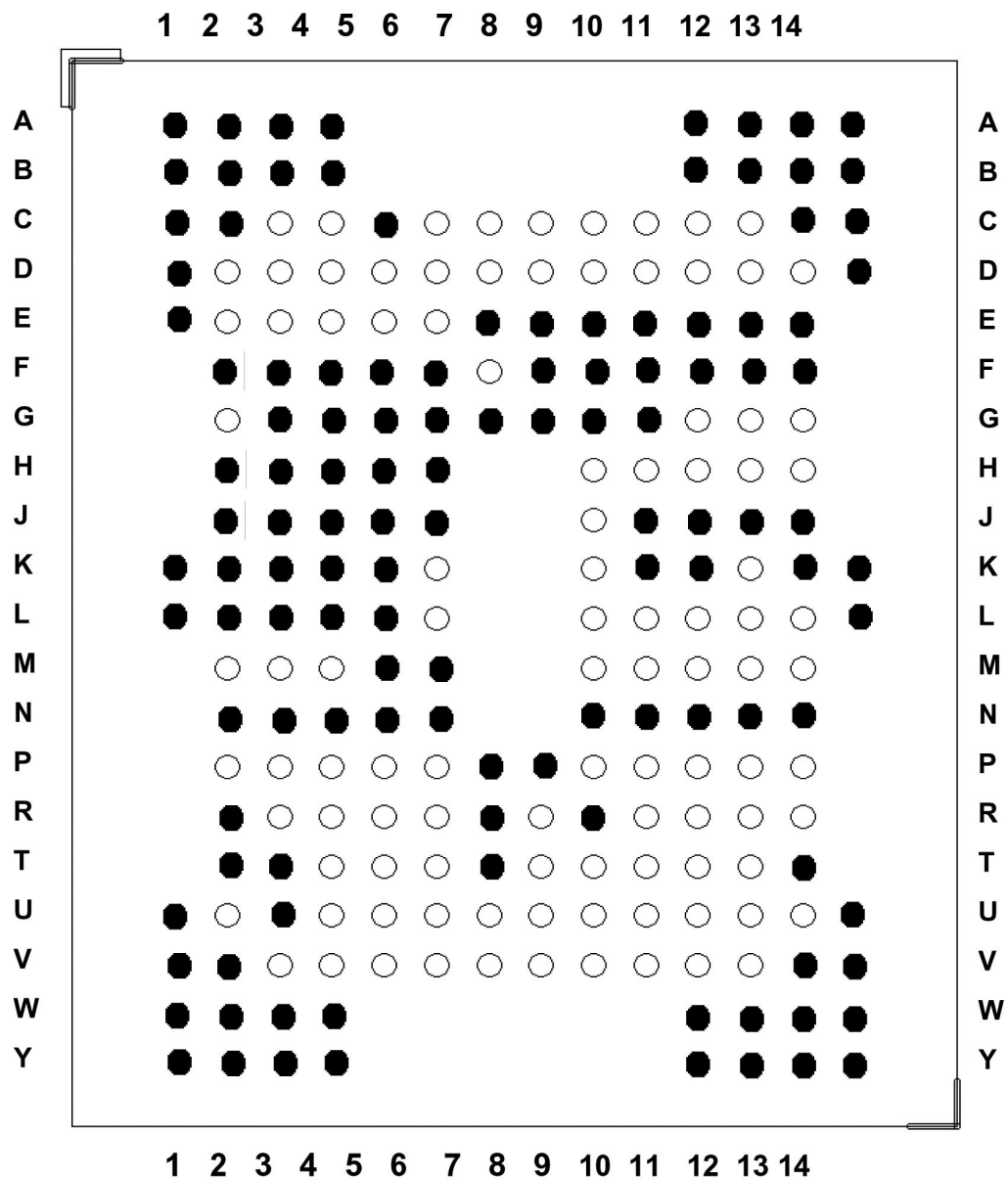


○ USE

● NOT IN USE

8. BGM Pin Map

MCP(TOP View)

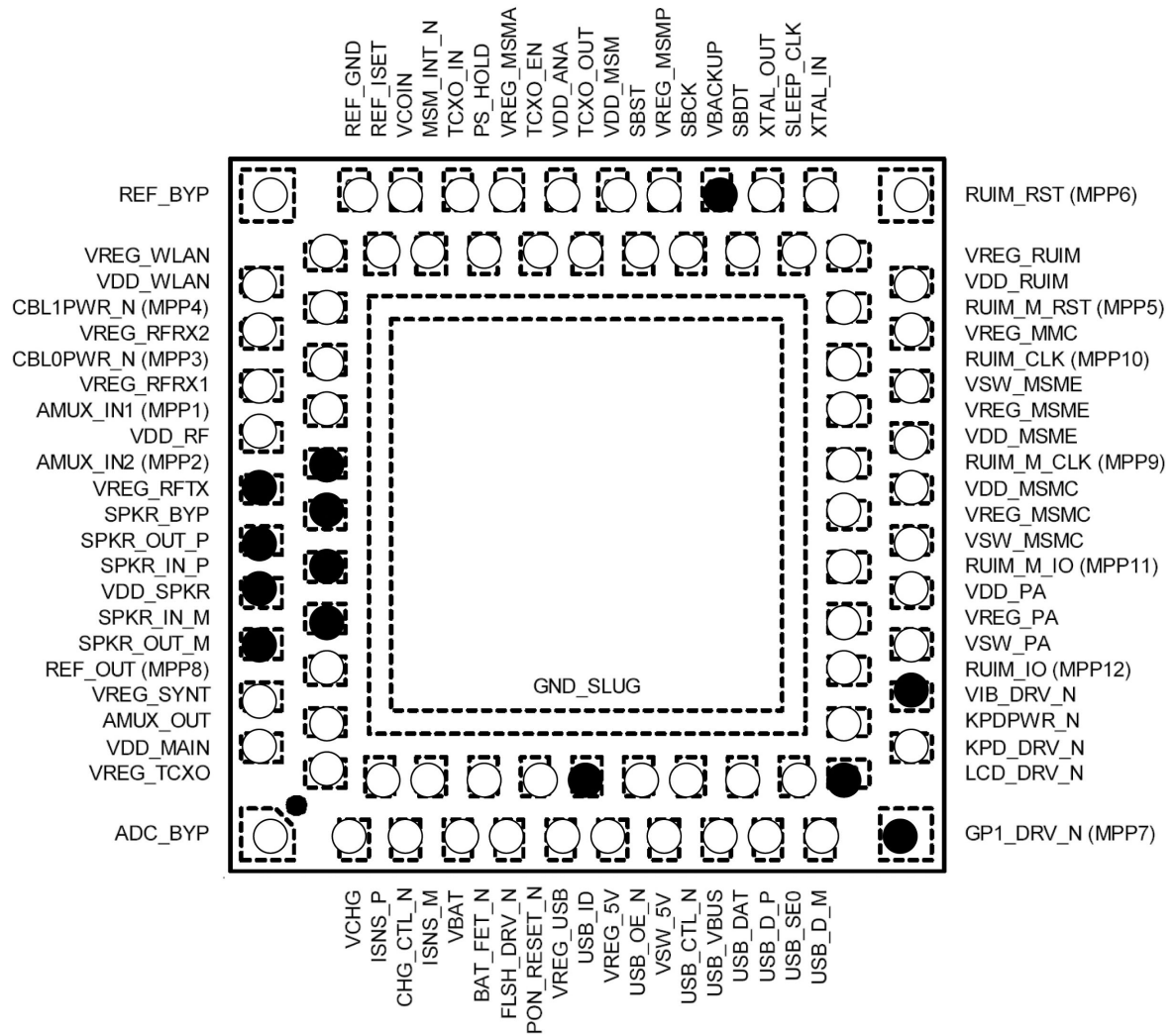


○ USE

● NOT IN USE

8. BGM Pin Map

PM6650-2(PMIC)

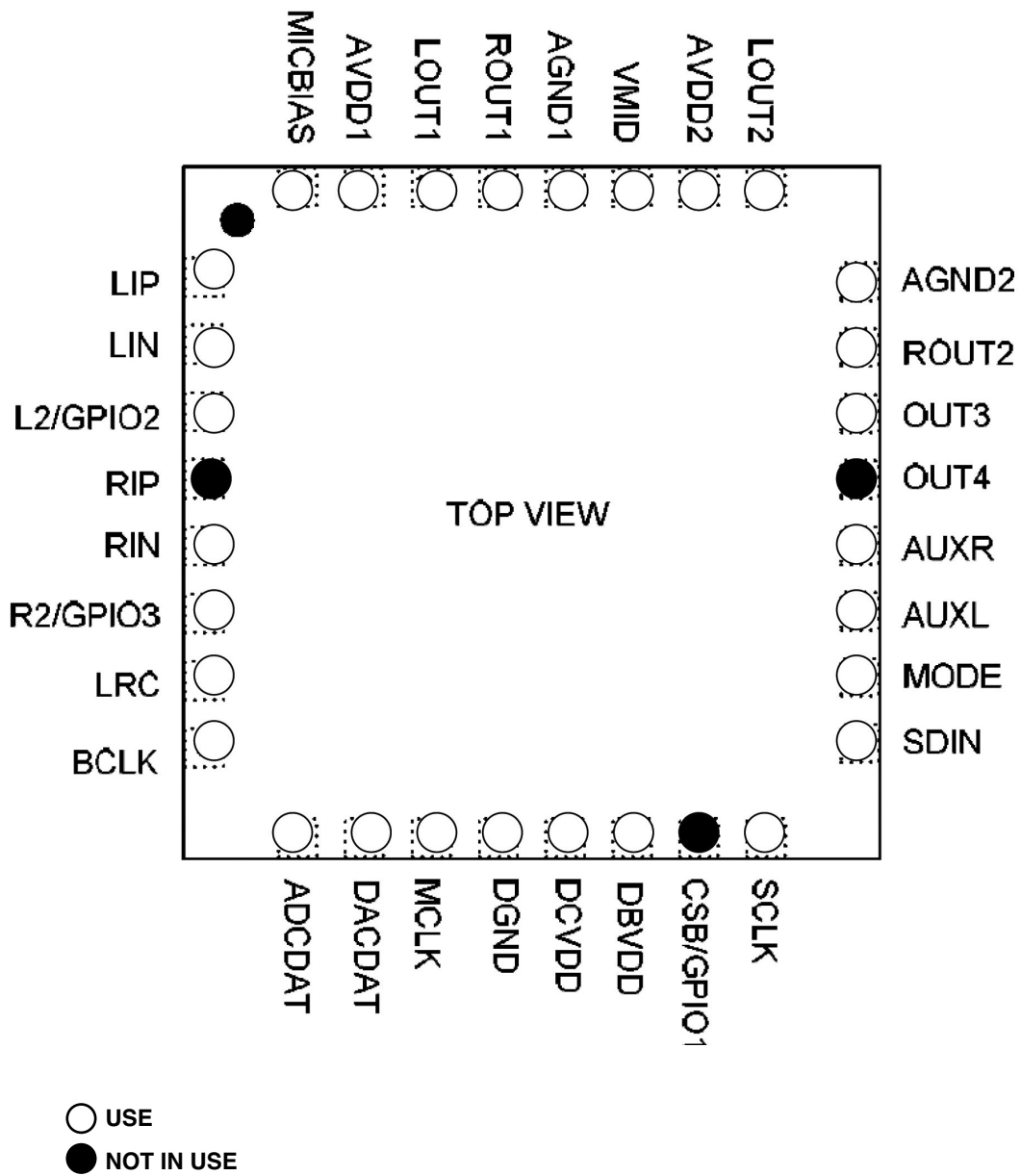


○ USE

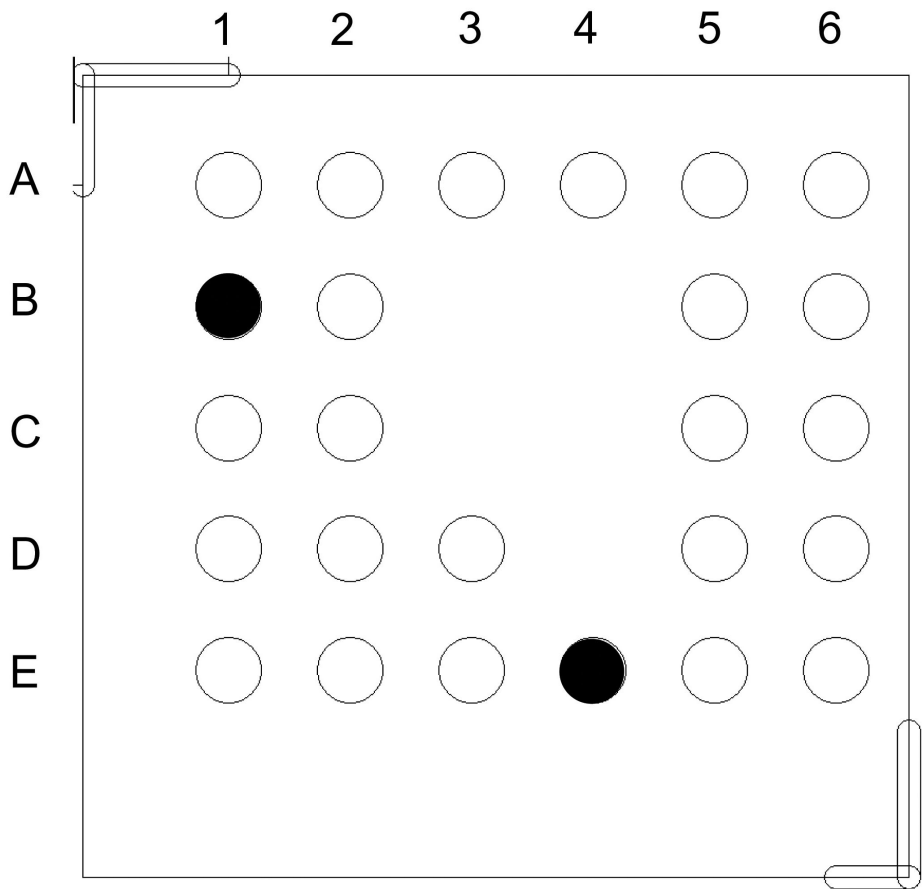
● NOT IN USE

8. BGM Pin Map

WM8983(Audio codec)



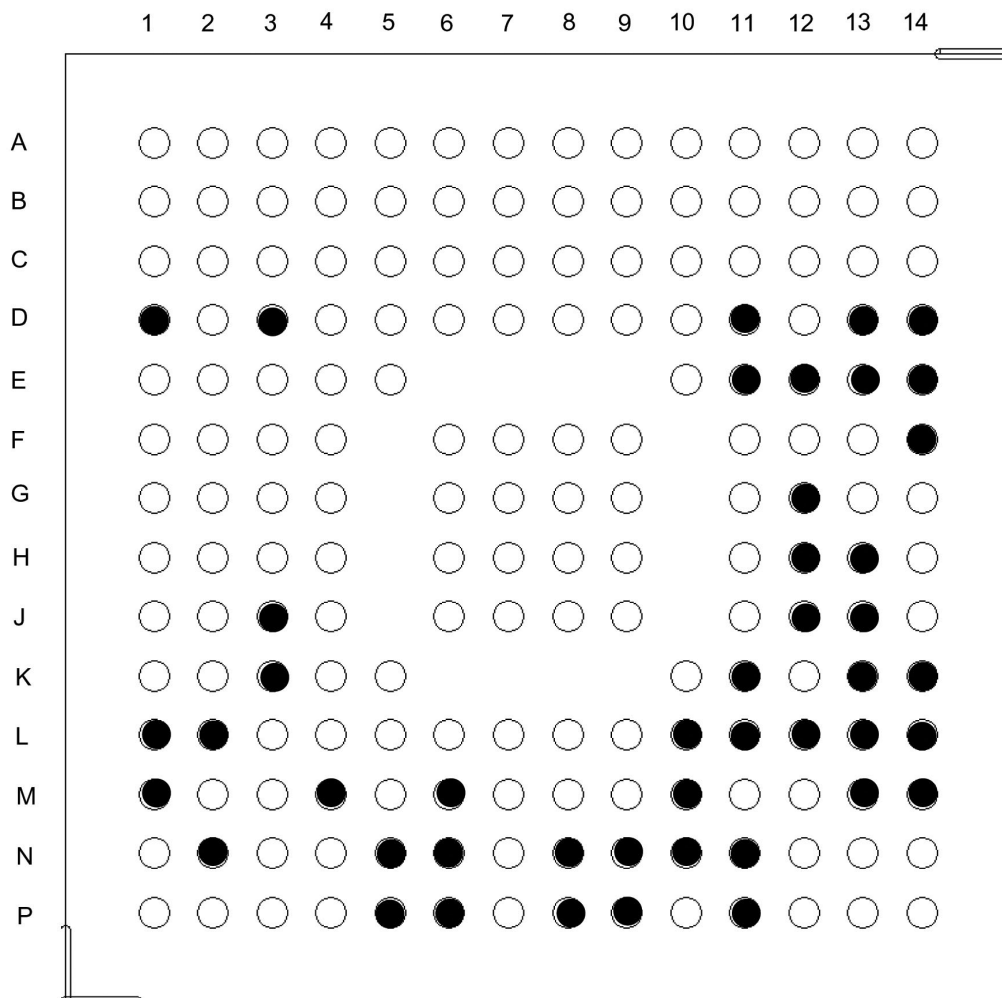
FM RADIO



○ USE
● NOT IN USE

8. BGM Pin Map

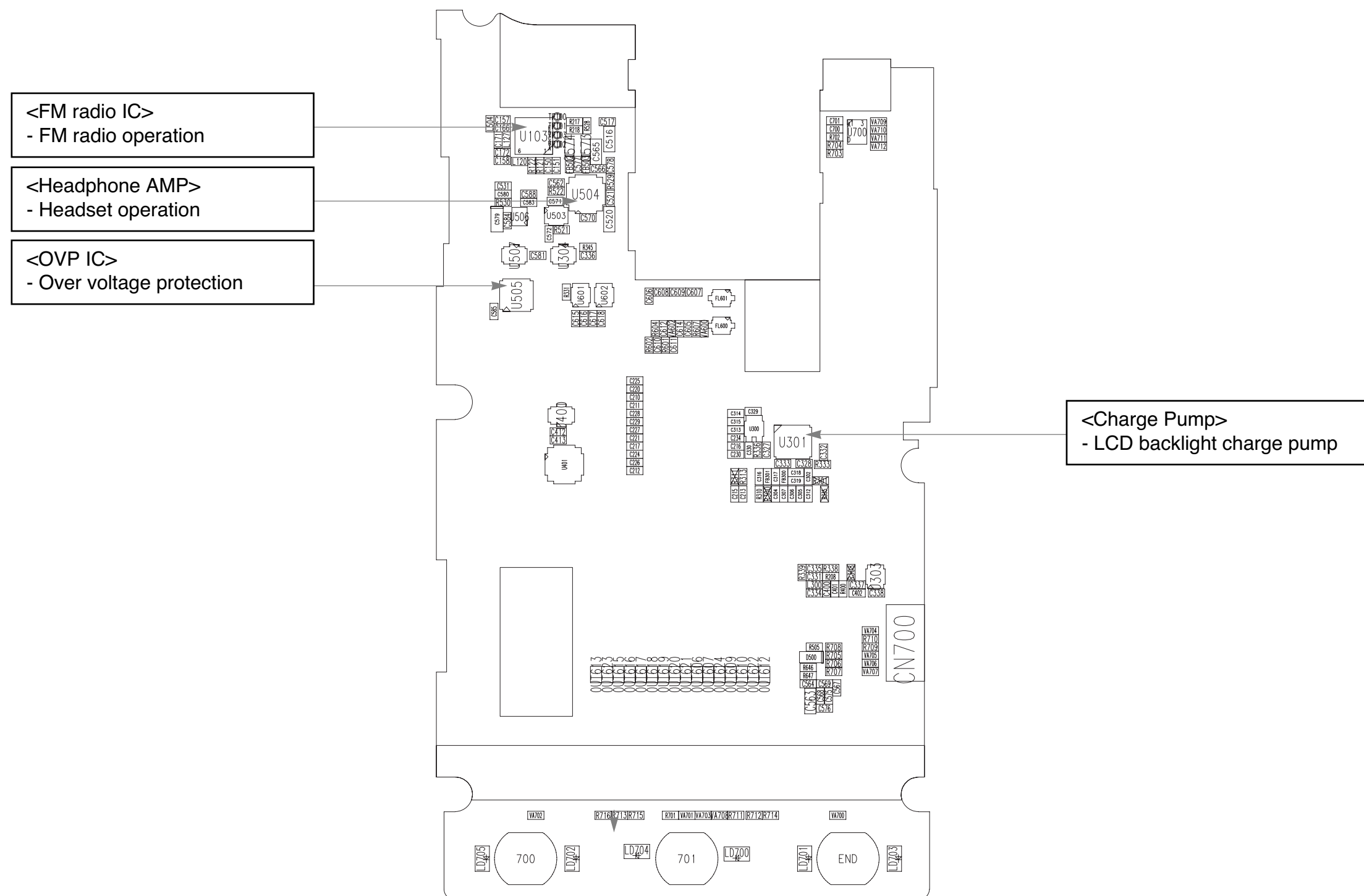
ZORAN(ZR3453)



○ USE

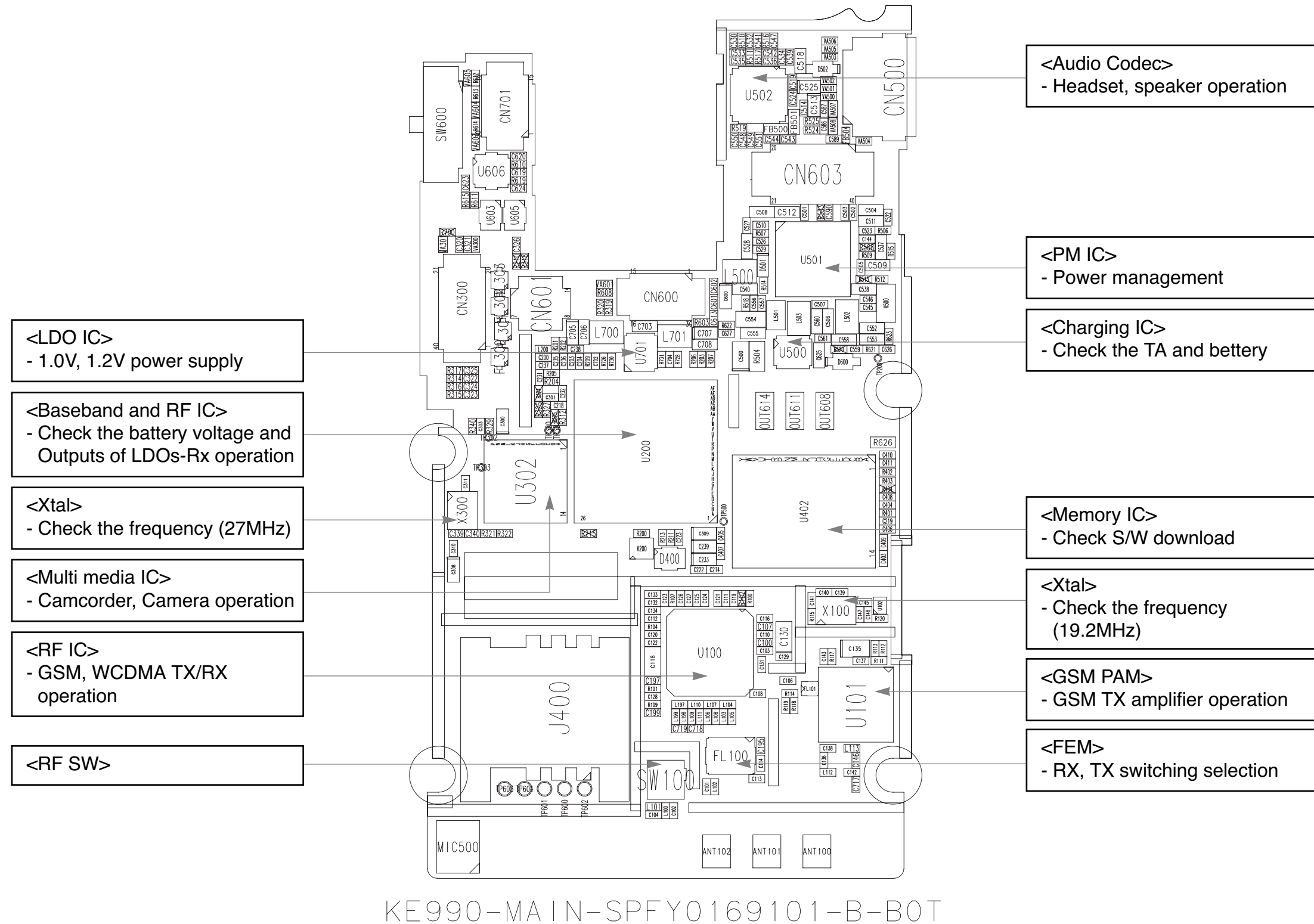
● NOT IN USE

9. PCB LAYOUT

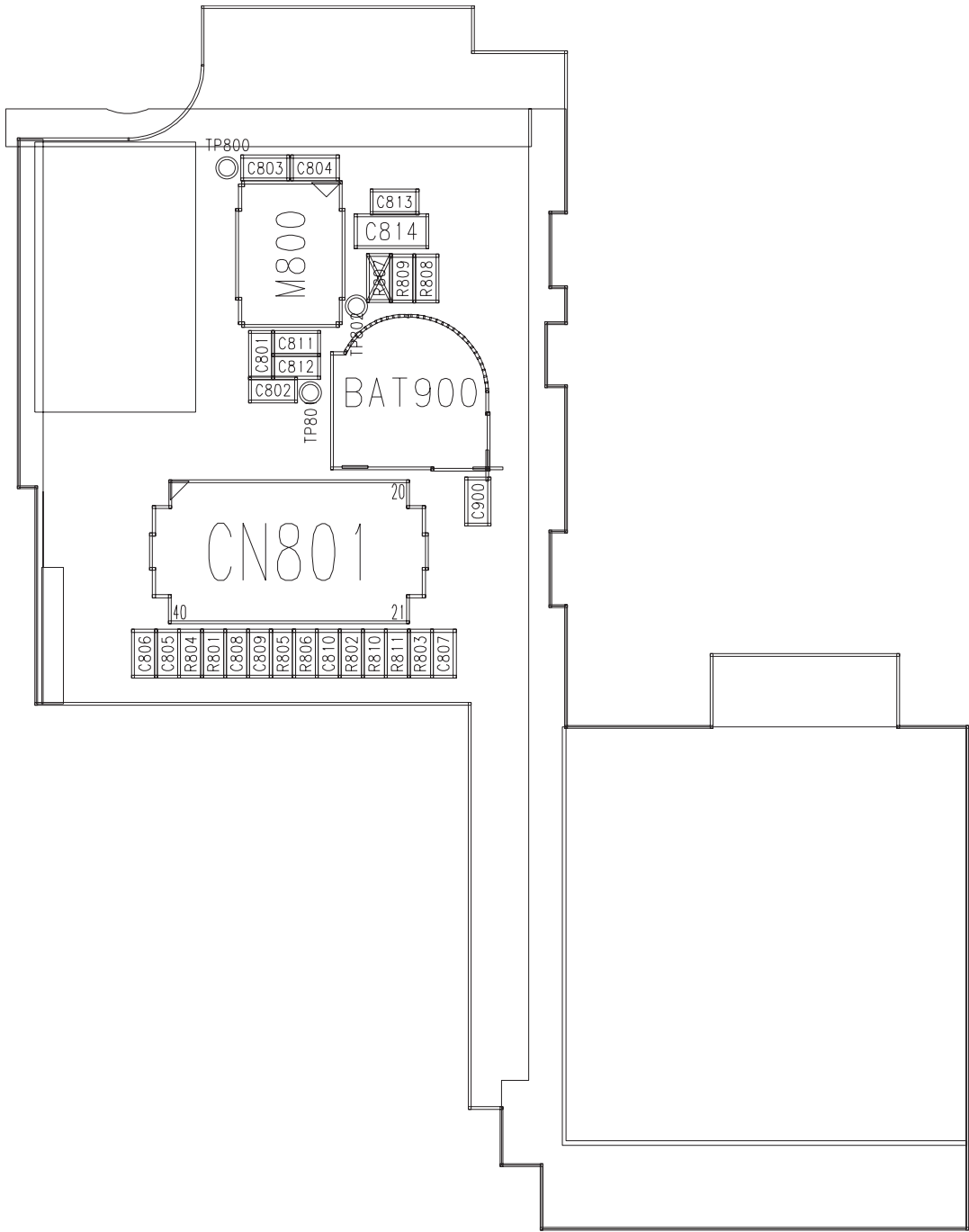


KE990-MAIN-SPFY0169101-B-TOP

9. PCB LAYOUT

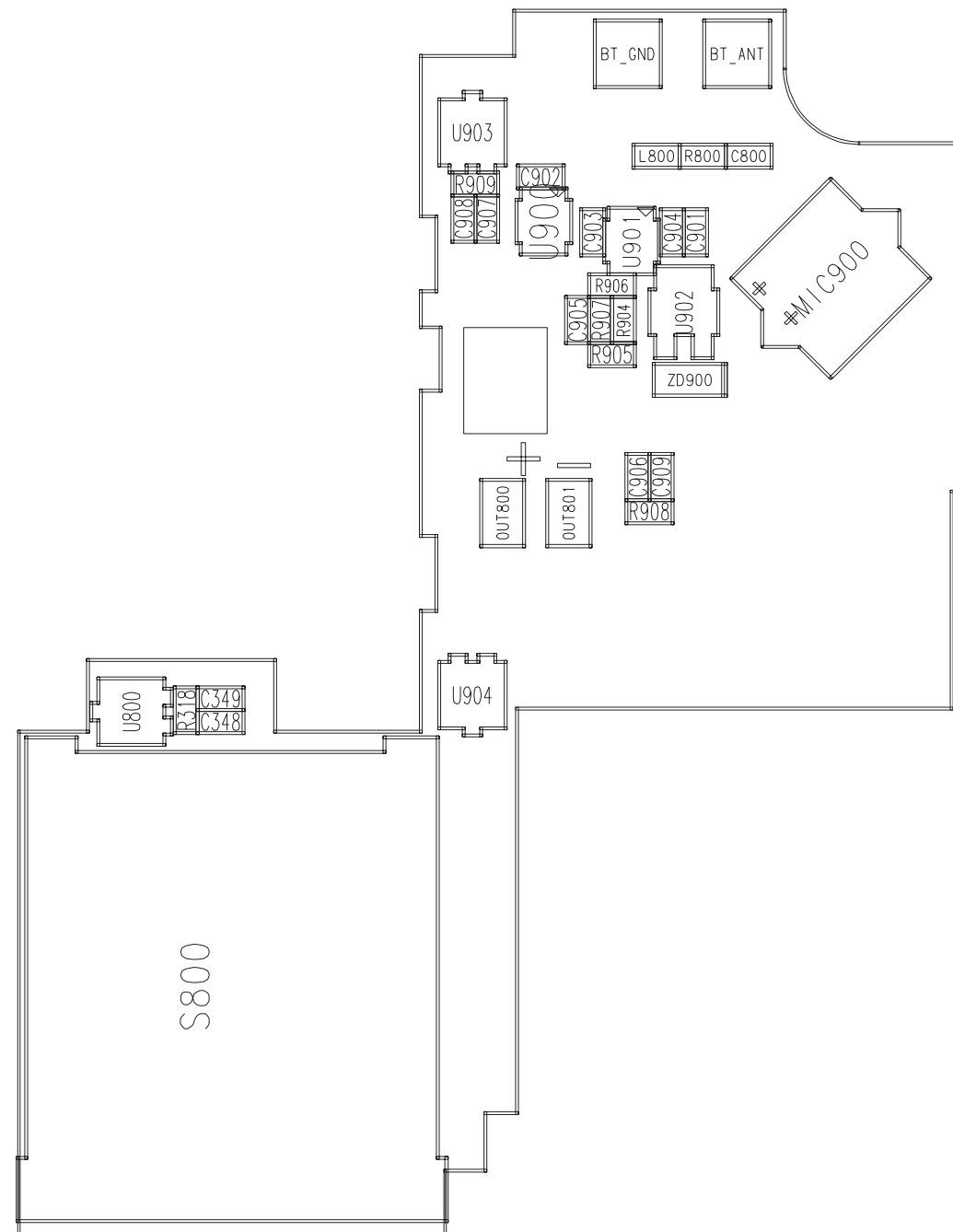


9. PCB LAYOUT



KE990-SUB-SPJY0050901-C-TOP

9. PCB LAYOUT

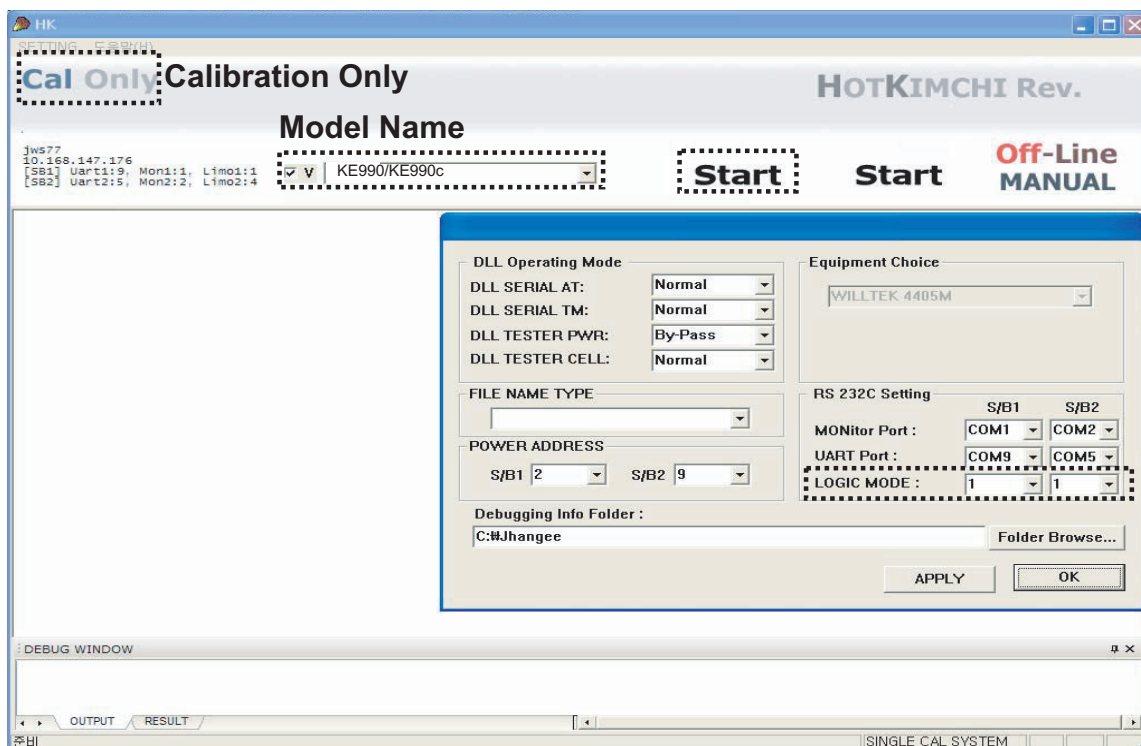


KE990-SUB-SPJY0050901-C-BTM

10. Calibration & RF Auto Test Program (Hot Kimchi)

10.1 Usage of Hot-Kimchi

10.1.1 RF Calibration



* Procedure

1. Click SETTING in menu, and logic operation in sub-menu.
Choose "1" in LOGIC MODE (means calibration alone)
2. Select the model name(KE990, KE998, KE990c, or KE990D) which you want in list box.
3. Click Start button to calibrate a phone.

10. Calibration & RF Auto Test Program (Hot Kimchi)

10.1.2 Basic Setting

The screenshot shows the 'Basic Setting' dialog box. It is organized into several sections:

- DLL Operating Mode:** Four dropdown menus, all set to 'Normal'.
 - DLL SERIAL AT:
 - DLL SERIAL TM:
 - DLL TESTER PWR:
 - DLL TESTER CELL:
- Equipment Choice:** A dropdown menu showing 'WILLTEK 4405M'.
- FILE NAME TYPE:** A dropdown menu showing 'TIME'.
- POWER ADDRESS:** Two dropdown menus for 'S/B1' (set to 2) and 'S/B2' (set to 9).
- Debugging Info Folder:** A text field containing 'C:\WJhangee' and a 'Folder Browse...' button.
- RS 232C Setting:** A section with four dropdowns for 'MONitor Port' (COM1), 'UART Port' (COM9), and 'LOGIC MODE' (1, 1). It also includes two additional dropdowns for 'S/B1' (COM2) and 'S/B2' (COM5).

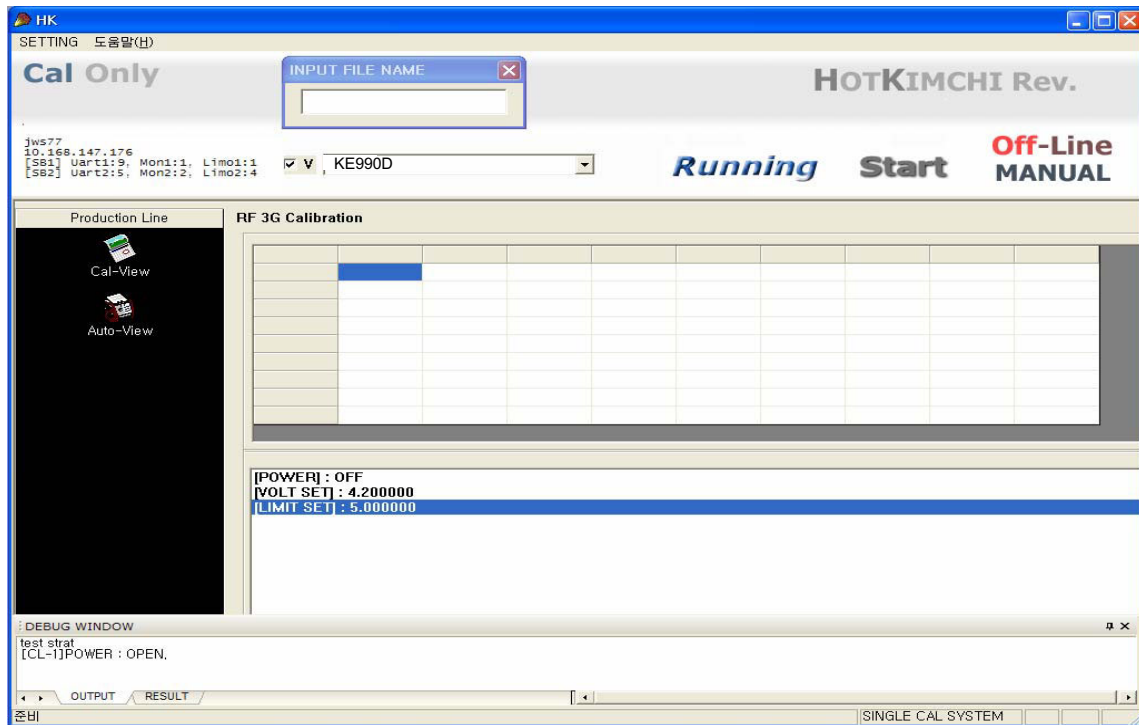
At the bottom of the dialog are 'APPLY' and 'OK' buttons.

* **Contents**

- Click SETTING in menu, and logic operation in sub-menu.
- You can select how to control AT command, Test Set, and Power supply in DLL Operating Mode.
- You can set UART Port and logic mode. (mode 1 : Calibration alone)
- You can set Result File's name type. If you choose "TIME", the saved files' name is saved in a real-time.
- You can run the multi mode. (S/B1,S/B2 : You can use S/B1 for only one port)
- You can set the path of HOTKIMCHI program.

10. Calibration & RF Auto Test Program (Hot Kimchi)

10.1.3 Basic Setting



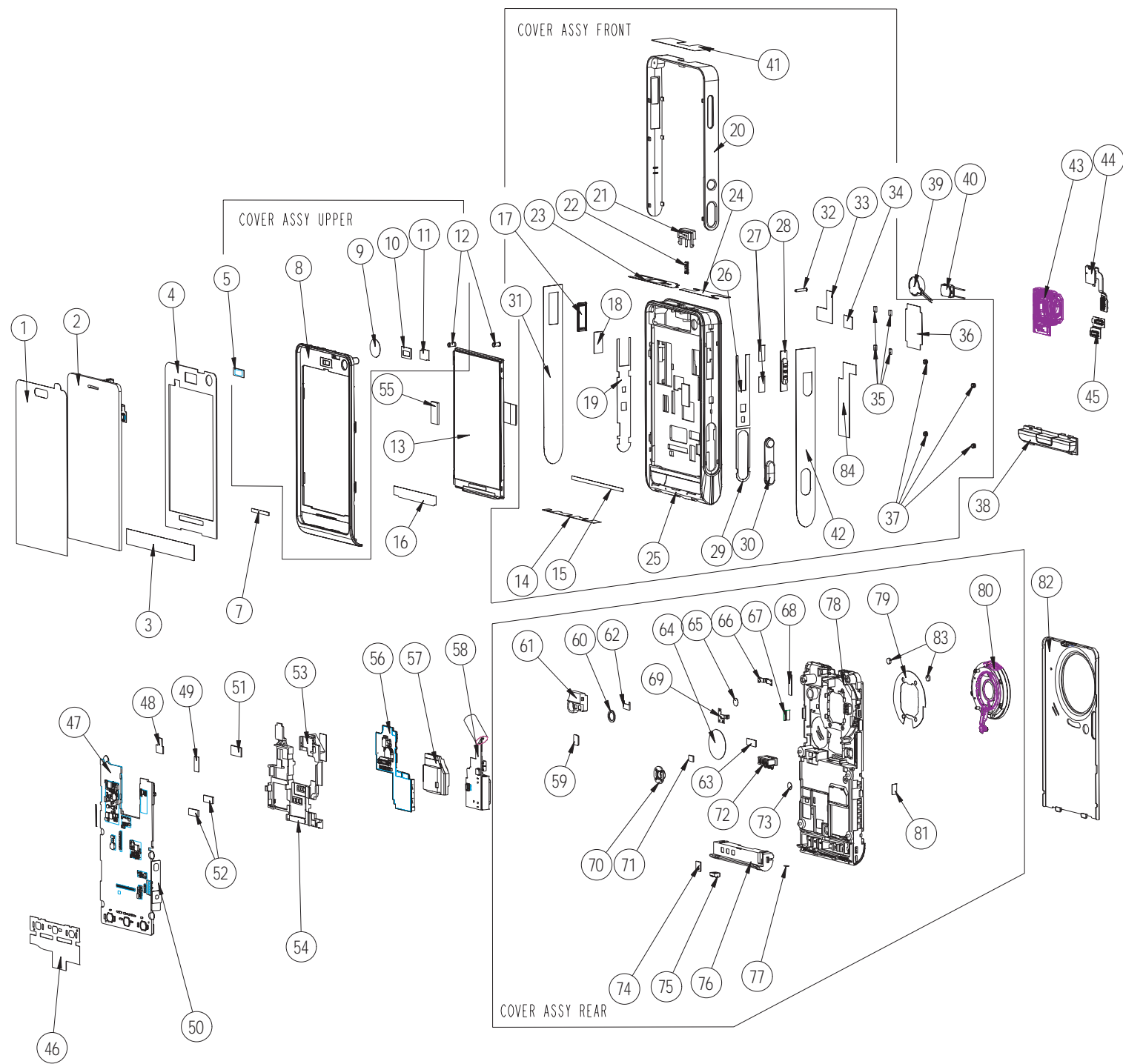
* Contents

- On Running, Log window is created in center area. It displays logs of command, and measurements of Calibration or Test.
- The result files are saved in the directory "C:\Jhangee\debug\Cal", "C:\Jhangee\debug\Auto", or "C:\Jhangee\debug\CalAuto".



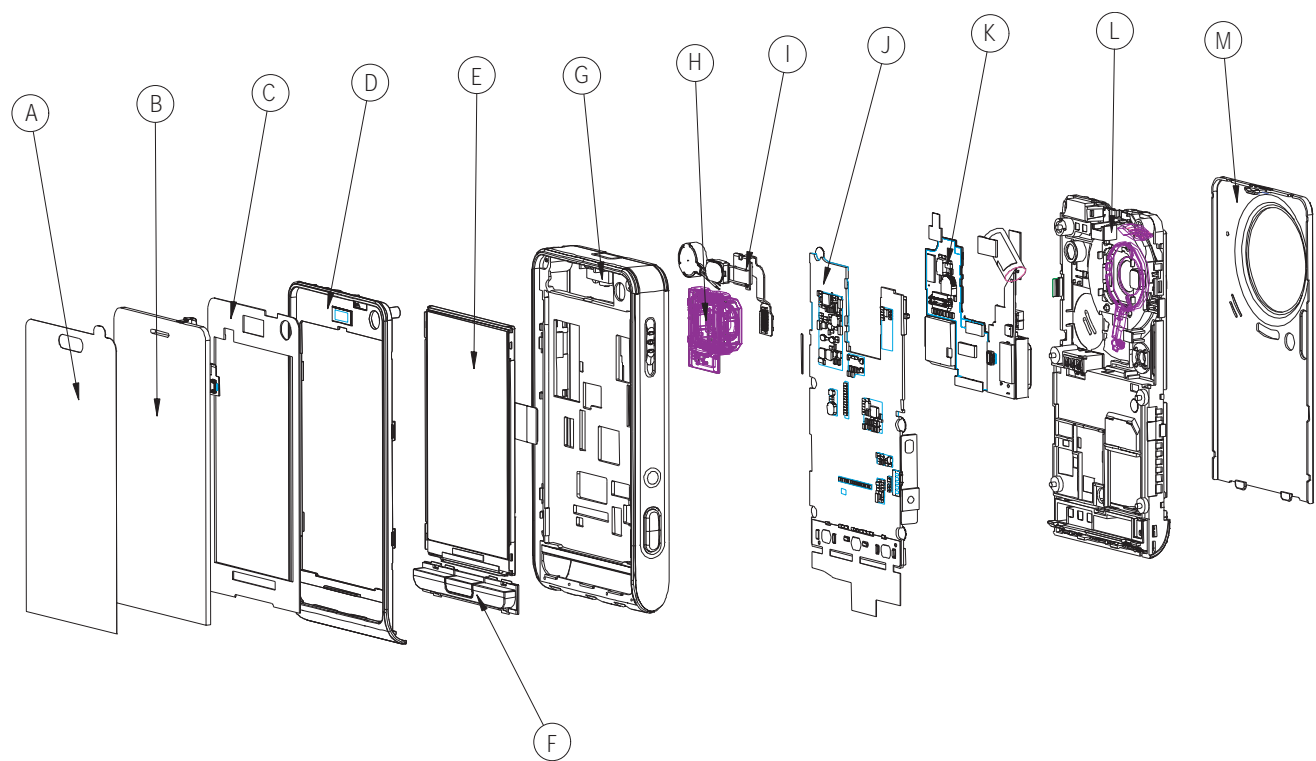
11. EXPLODED VIEW & REPLACEMENT PART LIST

11.1 EXPLODED VIEW



84	TAPE, INSULATOR FRONT	1	MIDZ0158501	
83	PAD, SILICON	2	MPH70206601	
82	COVER, BATTERY	1	MCJA0054501	
81	PLATE	1	MPFZ0029901	
80	WHEEL ASSY	1	ES0Y0001901	
79	PAD, WHEEL	1	MPBZ0193201	
78	COVER, REAR	1	MCJN0077401	
77	FILTER, MIKE RUBBER	1	MFBD0025301	
76	ANTENNA ASSY, ANTENNA	1	SNGF0031801	REMARK
75	PAD, MIKE RUBBER	1	MPBH0032401	
74	PAD, MIKE ANTENNA	1	MPBH0032201	
73	LABEL A/S	1	MLAB0001102	
72	BT CONNECTOR	1	ENZY0019901	
71	PAD, CONNECTOR STROBE	1	MPBU0007701	
70	WINDOW, CAMERA	1	MNAE0026401	
69	SPRING, PLATE	1	MSDD0007301	
68	TAPE, GASKET, 5	1	MTAZ0194001	
67	TAPE, INSULATOR	1	MTAZ0197401	
66	SPRING, PLATE 2	1	MSDD0006901	
65	FILTER, MOVING MIKE	1	MFBD0025401	
64	FILTER, SPEAKER	1	MFBC0033001	
63	PAD, CONNECTOR	1	MPBU0007901	
62	PAD, RECEIVER	1	MPBM0019401	
61	BT ANTENNA ASSY, ANTENNA	1	SNGF0027201	
60	PAD, MIKE 2	1	MPBH0032301	
59	PAD, CONNECTOR REAR	1	MPBU0007601	
58	STROBE	1	SMZY0016801	
57	MODULE, SPEAKER	1	SUSY0024801	
56	SUB PCB	1	SAJY0024901	
55	PAD, LCD CONN	1	MPBU0008001	
54	PAD, FRAME	1	MPBZ0190001	
53	FRAME, SHIELD	1	MFEA0015601	
52	PAD, FRAME SHIELD 5	2	MPBZ0199601	
51	PAD, CONNECTOR	1	MPBU0007801	
50	PCB, SIDEKEY	1	SPKY0049301	
49	PAD	1	MPBZ0187201	
48	PAD, MOTOR	1	MPBJ0045901	
47	PCB ASSY, MAIN	1	SAFY0203401	
46	DOME ASSY, METAL	1	ADCA0069301	
45	PCB, ASSY FLEXIBLE	1	SACE0057302	
44	PCB, ASSY FLEXIBLE	1	SACY0063001	
43	CAMERA, 5M	1	SVCY0014601	
42	TAPE, PROTECTION 2	1	MIDZ0160901	
41	TAPE, PROTECTION 3	1	MTAB0185401	
40	RECEIVER	1	SURY0012801	
39	MOTOR	1	SJMY0008502	
38	KEYPAD	1	MKAG0000901	
37	INSERT, NUT 1.5	4	MICA0019901	
36	PAD, CAMERA	1	MPBT0044701	
35	TAPE, GASKET 4	4	MTAC0057901	
34	TAPE, GASKET	1	MTAC0058101	
33	TAPE, SHIELD	1	MTAC0058201	
32	SHAFT	1	MSIY0001201	
31	TAPE, PROTECTION	1	MIDZ0160801	
30	BUTTON, SIDE	1	MBJL0042701	
29	TAPE, DECO(5)	1	MTAA0146601	
28	KNOB	1	MKBZ0002101	
27	TAPE, INSULATOR MODE	2	MTAZ0195901	
26	TAPE, DECO(1)	1	MTAA0142501	
25	COVER, FRONT	1	MCJK0073001	
24	TAPE, DECO(2)	1	MTAA0142601	
23	TAPE, DECO(3)	1	MTAA0142701	
22	SPRING, LOCKER	1	MSDC0010601	
21	LOCKER, BATTERY	1	MLEA0039301	
20	DECO, FRONT	1	MDAG0028401	
19	TAPE, DECO(4)	1	MTAA0142801	
18	TAPE, INSULATOR EAR JACK	1	MTAZ0195801	
17	CAP, EARPHONE JACK	1	MCCC0045901	
16	PAD, LCD	1	MPBG0065101	
15	TAPE, UPPER2	1	MTAZ0195701	
14	TAPE, UPPER	1	MTAZ0193901	
13	LCD	1	SVLM0025501	
12	INSERT, NUT	2	MICA0013901	
11	TAPE, CAMERA	1	MTAK0002501	
10	PAD, RECEIVER	1	MPBM0019201	
9	TAPE, MOTOR	1	MTAF0006001	
8	COVER	1	MCJZ0046501	
7	PAD, LCD IC	1	MPBG0068901	
6	FILTER, RECEIVER	1	MFBD0023201	
5	TAPE, WINDOW	1	MTAD0072001	
4	TAPE, PROTECTION KEYPAD	1	MTAB0182901	
3	WINDOW, LCD	1	MWAC0092901	
2	TAPE, PROTECTION WINDOW	1	MTAB0182802	
1				
NO.	DESCRIPTION	Q'TY	DRAWING NO.	REMARK

ASS'Y EXPLODED VIEW



M	COVER BATTERY		MCJA0054501	
L	COVER ASSY REAR		ACGM0104102	
K	SHIELD FRAME ASSY		AFBA0007701	
J	PCB MAIN		SAFY0248101	
I	PCB ASSY FLEXIBLE		SACY0067001	
H	5M CAMERA		SVCY0014601	
G	COVER ASSY FRONT		ACGK0102101	
F	KEYPAD		MKAG0000901	
E	LCD		SVLM0025501	
D	COVER UPPER		MCJZ0046501	
C	TAPE, WINDOW		ACGM0104101	
B	WINDOW LCD		MWAC0092901	
A	TAPE, PROTECTION WINDOW		MTAB0182802	
NO.	DESCRIPTION	Q'TY	DRAWING NO.	REMARK

11. EXPLODED VIEW & REPLACEMENT PART LIST

11.2 Replacement Parts <Mechanic component>

Note: This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	Part Number	Spec	Color	Remark
1		GSM,BAR/FILP	TGSM0058619		Black	
2	AAAY00	ADDITION	AAAY0270203		Black	
3	MCJA00	COVER,BATTERY	MCJA0054501	PRESS, Al, , , ,	Black	M
3	MHBY00	HANDSTRAP	MHBY0004310	COMPLEX, (empty), , , ,	Without Color	
3	MPHY00	PROTECTOR	MPHY0011303		Without Color	
2	APEY00	PHONE	APEY0534503		Black	
3	ACGM00	COVER ASSY,REAR	ACGM0104102		Black	L
4	MCJN00	COVER,REAR	MCJN0077401	MOLD, PC LUPOY SC-1004A, , , ,	Black	78
4	MFBC00	FILTER,SPEAKER	MFBC0033001	COMPLEX, (empty), , , ,	Without Color	64
4	MFBD00	FILTER,MIKE	MFBD0025301	COMPLEX, (empty), , , ,	Without Color	77
4	MFBD01	FILTER,MIKE	MFBD0025401	COMPLEX, (empty), , , ,	Black	65
4	MLAB00	LABEL,A/S	MLAB0001102	C2000 USASV DIA 4.0	White	73
4	MPBH00	PAD,MIKE	MPBH0032201	COMPLEX, (empty), , , ,	Without Color	74
4	MPBH01	PAD,MIKE	MPBH0032301	COMPLEX, (empty), , , ,	Without Color	60
4	MPBH02	PAD,MIKE	MPBH0032401	COMPLEX, (empty), , , ,	Without Color	75
4	MPBM00	PAD,RECEIVER	MPBM0019401	COMPLEX, (empty), , , ,	Without Color	62
4	MPBU01	PAD,CONNECTOR	MPBU0007701	COMPLEX, (empty), , , ,	Without Color	71
4	MPBU02	PAD,CONNECTOR	MPBU0007901	COMPLEX, (empty), , , ,	Without Color	63
4	MPBU03	PAD,CONNECTOR	MPBU0007601	COMPLEX, (empty), , , ,	Without Color	59
4	MPBZ00	PAD	MPBZ0193201	COMPLEX, (empty), , , ,	Without Color	79
4	MPBZ01	PAD	MPBZ0200601	COMPLEX, (empty), , , ,	Black	
4	MPFZ00	PLATE	MPFZ0029901	COMPLEX, (empty), , , ,	Without Color	81
4	MSDD00	SPRING,PLATE	MSDD0007301	PRESS, Bs, 0.15, , , ,	Gold	69

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
4	MSDD01	SPRING,PLATE	MSDD0006901	PRESS, Bs, , , , ,	Gold	66
4	MTAZ00	TAPE	MTAZ0197401	COMPLEX, (empty), 0.1, , , ,	Without Color	67
4	MTAZ01	TAPE	MTAZ0194001	COMPLEX, (empty), , , , ,	Without Color	68
4	MWAE00	WINDOW,CAMERA	MWAE0026401	MOLD, Polyarylamide IXEF 1032, , , , ,	Without Color	70
3	ACGV00	COVER ASSY,BAR	ACGV0000301		Black	
4	ACGK00	COVER ASSY,FRONT	ACGK0102101		Black	
5	MBJL00	BUTTON,SIDE	MBJL0042701	MOLD, ABS MP-211, , , , ,	Silver	30
5	MCCC00	CAP,EARPHONE JACK	MCCC0045901	COMPLEX, (empty), , , , ,	Black	17
5	MCJK00	COVER,FRONT	MCJK0073001	MOLD, PC LUPOY SC-1004A, , , , ,	Black	25
6	MICA00	INSERT,FRONT	MICA0019901	M1.4 D2.2 L1.5	Gold	37
5	MDAG00	DECO,FRONT	MDAG0028401	MOLD, PC LUPOY SC-1004A, , , , ,	Black	20
5	MIDZ00	INSULATOR	MIDZ0158501	COMPLEX, (empty), 0.07T, , , ,	Without Color	84
5	MIDZ01	INSULATOR	MIDZ0160801	COMPLEX, (empty), , , , ,	Without Color	31
5	MIDZ02	INSULATOR	MIDZ0160901	COMPLEX, (empty), , , , ,	Without Color	42
5	MKBZ00	KNOB	MKBZ0002101	MOLD, PC LUPOY SC-1004A, , , , ,	Black	28
5	MLEA00	LOCKER,BATTERY	MLEA0039301	MOLD, PC LUPOY SC-1004A, , , , ,	Black	21
5	MPBT00	PAD,CAMERA	MPBT0044701	COMPLEX, (empty), , , , ,	Without Color	36
5	MSDC00	SPRING,LOCKER	MSDC0010601		Without Color	22
5	MSIY00	SHAFT	MSIY0001201	CUTTING, STS, , , , ,	Silver	32
5	MTAA00	TAPE,DECO	MTAA0142501	COMPLEX, (empty), , , , ,	Without Color	26
5	MTAA01	TAPE,DECO	MTAA0142601	COMPLEX, (empty), , , , ,	Without Color	24
5	MTAA02	TAPE,DECO	MTAA0142701	COMPLEX, (empty), , , , ,	Without Color	23
5	MTAA03	TAPE,DECO	MTAA0142801	COMPLEX, (empty), , , , ,	Without Color	19
5	MTAA04	TAPE,DECO	MTAA0146601	COMPLEX, (empty), , , , ,	Without Color	29
5	MTAB00	TAPE,PROTECTION	MTAB0185401	COMPLEX, (empty), , , , ,	Without Color	41

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
5	MTAC00	TAPE,SHIELD	MTAC0057901	COMPLEX, (empty), , , ,	Without Color	35
5	MTAC01	TAPE,SHIELD	MTAC0058101	COMPLEX, (empty), , , ,	Without Color	34
5	MTAZ00	TAPE	MTAZ0195701	COMPLEX, (empty), , , ,	Without Color	15
5	MTAZ01	TAPE	MTAZ0193901	COMPLEX, (empty), , , ,	Black	14
5	MTAZ02	TAPE	MTAZ0195801	COMPLEX, (empty), , , ,	Without Color	18
5	MTAZ03	TAPE	MTAZ0195901	COMPLEX, (empty), , , ,	Without Color	27
4	ACGZ00	COVER ASSY	ACGZ0013901	UPPER	Without Color	
5	MCJZ00	COVER	MCJZ0046501	MOLD, PC LUPOY SC-1004A, , , ,	Black	8,D
6	MICA01	INSERT,FRONT	MICA0013901	2.2X4.0	Without Color	12
5	MFBB00	FILTER,RECEIVER	MFBB0023201	COMPLEX, (empty), , , ,	Without Color	5
5	MPBM00	PAD,RECEIVER	MPBM0019201	COMPLEX, (empty), , , ,	Without Color	10
5	MTAF	TAPE,MOTOR	MTAF0006001	COMPLEX, (empty), , , ,	Without Color	9
5	MTAK00	TAPE,CAMERA	MTAK0002501	COMPLEX, (empty), , , ,	Without Color	11
4	MKAG00	KEYPAD,MAIN	MKAG0000901	MOLD, PC LUPOY SC-1004A, , , ,	Black	38
4	MLAZ00	LABEL	MLAZ0038303	PRINTING, (empty), , , ,	White	
4	MPBG00	PAD,LCD	MPBG0065101	COMPLEX, (empty), , , ,	Black	16
4	MPBG01	PAD,LCD	MPBG0068901	COMPLEX, (empty), , , ,	Without Color	7
4	MPBU00	PAD,CONNECTOR	MPBU0008001	COMPLEX, (empty), , , ,	Without Color	55
4	MTAB00	TAPE,PROTECTION	MTAB0182802		Without Color	1,A
4	MTAB01	TAPE,PROTECTION	MTAB0182901	COMPLEX, (empty), , , ,	Without Color	3
4	MTAC00	TAPE,SHIELD	MTAC0058201	COMPLEX, (empty), , , ,	Without Color	33
4	MTAD00	TAPE,WINDOW	MTAD0084001	COMPLEX, (empty), , , ,	Black	
4	MWAC00	WINDOW,LCD	MWAC0092901	COMPLEX, (empty), , , ,	Black	2,B
3	GMEY00	SCREW MACHINE,BIND	GMEY0010601	1.4 mm,2.5 mm,MSWR3(BK) ,N ,+ ,NYLOK	Black	
3	MLAK00	LABEL,MODEL	MLAK0022301	PRINTING, (empty), , , ,	White	

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
5	ADCA00	DOME ASSY,METAL	ADCA0069301		Without Color	46
5	MLAZ00	LABEL	MLAZ0038301	PID Label 4 Array	Without Color	
5	AFBA00	FRAME ASSY,SHIELD	AFBA0007701		Without Color	K
6	MFEA00	FRAME,SHIELD	MFEA0015601	MOLD, ABS MP-211, , , , ,	Without Color	53
6	MPBJ00	PAD,MOTOR	MPBJ0045901	COMPLEX, (empty), , , , ,	Without Color	48
6	MPBU01	PAD,CONNECTOR	MPBU0007801	COMPLEX, (empty), , , , ,	Without Color	51
6	MPBZ00	PAD	MPBZ0199601	COMPLEX, (empty), , , , ,	Without Color	52
6	MPBZ01	PAD	MPBZ0190001	COMPLEX, (empty), , , , ,	Without Color	54
5	MPBZ00	PAD	MPBZ0187201	COMPLEX, (empty), , , , ,	Without Color	49

Note: This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

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11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	C131	CAP,CHIP,MAKER	ECZH0000813	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C132	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C133	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C134	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C135	CAP,TANTAL,CHIP	ECTH0005501	33 uF,10V ,M ,L _ESR ,2012 ,R/TP ,; , , [empty] , [empty] , ,-55TO+125C , , [empty] , [empty] , [empty] , [empty]		
6	C136	CAP,CERAMIC,CHIP	ECCH0001001	6.8 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C137	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C139	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C140	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C141	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C142	INDUCTOR,CHIP	ELCH0004718	5.6 nH,S ,1005 ,R/TP ,		
6	C143	CAP,CHIP,MAKER	ECZH0000844	68 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C144	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C145	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C146	CAP,CERAMIC,CHIP	ECCH0000175	2.7 pF,50V ,B ,NP0 ,TC ,1005 ,R/TP		
6	C147	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C148	CAP,CHIP,MAKER	ECZH0001105	8200 pF,16V ,K ,X7R ,HD ,1005 ,R/TP		
6	C195	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C197	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C199	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C200	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	C214	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C218	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C219	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C222	CAP,CERAMIC,CHIP	ECCH0000147	2.2 nF,50V,K,X7R,HD,1005,R/TP		
6	C223	CAP,CERAMIC,CHIP	ECCH0000161	33 nF,16V,K,X7R,HD,1005,R/TP		
6	C231	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C232	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C233	CAP,TANTAL,CHIP	ECTH0003701	10 uF,6.3V ,M ,L _ESR ,1608 ,R/TP		
6	C235	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C236	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	C238	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C239	CAP,CERAMIC,CHIP	ECCH0007802	4.7 uF,10V ,M ,X5R ,TC ,1608 ,R/TP		
6	C300	CAP,TANTAL,CHIP	ECTH0003701	10 uF,6.3V ,M ,L_ ESR ,1608 ,R/TP		
6	C301	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C303	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C309	CAP,TANTAL,CHIP	ECTH0003701	10 uF,6.3V ,M ,L_ ESR ,1608 ,R/TP		
6	C310	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C311	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	C321	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C322	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C323	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C324	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C325	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C326	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C339	CAP,CERAMIC,CHIP	ECCH0000109	8 pF,50V,D,NP0,TC,1005,R/TP		
6	C340	CAP,CERAMIC,CHIP	ECCH0000109	8 pF,50V,D,NP0,TC,1005,R/TP		
6	C403	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C404	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C405	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C406	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C407	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C408	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C409	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C410	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C411	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C500	CAP,TANTAL,CHIP	ECTH0005501	33 uF,10V ,M ,L_ ESR ,2012 ,R/TP , ; , [empty] , [empty] , ,-55TO+125C , , [empty] , [empty] , [empty] , [empty]		
6	C501	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C502	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C503	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C504	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C505	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	C506	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C507	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C508	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C509	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C510	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C511	CAP,CHIP,MAKER	ECZH0001421	2.2 uF,6.3V ,K ,X5R ,HD ,1608 ,R/TP		
6	C512	CAP,CHIP,MAKER	ECZH0003503	1 uF,25V ,K ,X5R ,HD ,1608 ,R/TP		
6	C513	CAP,TANTAL,CHIP	ECTH0004807	10 uF,10V ,M ,STD ,1608 ,R/TP ,; , ,[empty] ,[empty] , , - 55TO+125C , ,[empty] ,[empty] ,[empty] ,[empty]		
6	C514	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C518	CAP,CERAMIC,CHIP	ECCH0007802	4.7 uF,10V ,M ,X5R ,TC ,1608 ,R/TP		
6	C519	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C522	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C523	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C524	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C525	CAP,TANTAL,CHIP	ECTH0004807	10 uF,10V ,M ,STD ,1608 ,R/TP ,; , ,[empty] ,[empty] , , - 55TO+125C , ,[empty] ,[empty] ,[empty] ,[empty]		
6	C526	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C527	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C528	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C529	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C530	CAP,CERAMIC,CHIP	ECCH0000199	12 nF,16V ,K ,X7R ,HD ,1005 ,R/TP		
6	C532	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C533	CAP,CERAMIC,CHIP	ECCH0000151	4.7 nF,25V,K,X7R,HD,1005,R/TP		
6	C534	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C535	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C536	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C537	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C538	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C539	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C540	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C541	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C542	CAP,CERAMIC,CHIP	ECCH0000151	4.7 nF,25V,K,X7R,HD,1005,R/TP		

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	C545	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C546	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C547	CAP,CERAMIC,CHIP	ECCH0000199	12 nF,16V ,K ,X7R ,HD , 1005 ,R/TP		
6	C548	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC , 1005 ,R/TP		
6	C549	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC , 1005 ,R/TP		
6	C552	CAP,CHIP,MAKER	ECZH0001421	2.2 uF,6.3V ,K ,X5R ,HD ,1608 ,R/TP		
6	C553	CAP,CHIP,MAKER	ECZH0001421	2.2 uF,6.3V ,K ,X5R ,HD ,1608 ,R/TP		
6	C554	CAP,CERAMIC,CHIP	ECCH0000393	22000000 pF,6.3V ,M ,X5R ,HD ,2012 ,R/TP , , [empty] [empty] , [empty] , [empty] , [empty] , [empty] , 1.25 mm		
6	C555	CAP,CERAMIC,CHIP	ECCH0005604	10 uF,6.3V ,M ,X5R ,TC , 1608 ,R/TP		
6	C556	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD , 1005 ,R/TP		
6	C557	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C558	CAP,CERAMIC,CHIP	ECCH0005604	10 uF,6.3V ,M ,X5R ,TC , 1608 ,R/TP		
6	C559	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD , 1005 ,R/TP		
6	C560	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC , 1608 ,R/TP		
6	C561	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD , 1005 ,R/TP		
6	C586	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP		
6	C587	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP		
6	C589	CAP,CHIP,MAKER	ECZH0000830	33 pF,50V ,J ,NP0 ,TC , 1005 ,R/TP		
6	C590	CAP,CERAMIC,CHIP	ECCH0000198	2.2 uF,6.3V ,M ,X5R ,TC , 1005 ,R/TP		
6	C600	CAP,TANTAL,CHIP	ECTH0003701	10 uF,6.3V ,M ,L_ ESR , 1608 ,R/TP		
6	C601	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD , 1005 ,R/TP		
6	C602	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC , 1005 ,R/TP		
6	C613	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	C619	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC , 1005 ,R/TP		
6	C620	CAP,CERAMIC,CHIP	ECCH0000147	2.2 nF,50V,K,X7R,HD,1005,R/TP		
6	C623	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD , 1005 ,R/TP		
6	C624	CAP,CERAMIC,CHIP	ECCH0000147	2.2 nF,50V,K,X7R,HD,1005,R/TP		
6	C625	CAP,CERAMIC,CHIP	ECCH0005604	10 uF,6.3V ,M ,X5R ,TC , 1608 ,R/TP		
6	C626	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD , 1005 ,R/TP		
6	C627	VARISTOR	SEVY0000702	14 V,10% ,SMD ,		
6	C702	CAP,CHIP,MAKER	ECZH0000813	100 pF,50V ,J ,NP0 ,TC , 1005 ,R/TP		

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	C703	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C704	CAP,CHIP,MAKER	ECZH0000813	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C705	CAP,CERAMIC,CHIP	ECCH0007802	4.7 uF,10V ,M ,X5R ,TC ,1608 ,R/TP		
6	C706	CAP,CHIP,MAKER	ECZH0001421	2.2 uF,6.3V ,K ,X5R ,HD ,1608 ,R/TP		
6	C707	CAP,CERAMIC,CHIP	ECCH0007802	4.7 uF,10V ,M ,X5R ,TC ,1608 ,R/TP		
6	C708	CAP,CHIP,MAKER	ECZH0001421	2.2 uF,6.3V ,K ,X5R ,HD ,1608 ,R/TP		
6	C717	CAP,CERAMIC,CHIP	ECCH0001001	6.8 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C719	INDUCTOR,CHIP	ELCH0001413	22 nH,J ,1005 ,R/TP ,PBFREE		
6	CN300	CONNECTOR,BOARD TO BOARD	ENBY0036001	40 PIN,0.4 mm,ETC , ,H=1.0, Socket		
6	CN500	CONNECTOR,I/O	ENRY0006401	18 PIN,0.4 mm,ANGLE , ,H=2.5, Reverse Type		
6	CN600	CONNECTOR,BOARD TO BOARD	ENBY0040701	30 PIN, mm,ETC , , , , ,0.40MM ,STRAIGHT ,FEMALE ,SMD ,R/TP ,1.0 ,		
6	CN601	CONNECTOR,BOARD TO BOARD	ENBY0033101	10 PIN,0.4 mm,ETC , ,H=1.5, P4S Header		
6	CN603	CONNECTOR,BOARD TO BOARD	ENBY0029501	40 PIN,0.4 mm,ETC , ,H=3.0, Socket		
6	CN701	CONNECTOR,BOARD TO BOARD	ENBY0040701	30 PIN, mm,ETC , , , , ,0.40MM ,STRAIGHT ,FEMALE ,SMD ,R/TP ,1.0 ,		
6	D400	DIODE,TVS	EDTY0008607	SC70-6L ,6 V,200 W,R/TP ,PB-FREE		
6	D501	DIODE,SWITCHING	EDSY0011901	EMD2 ,30 V,1 A,R/TP ,VF=1.5V(IF=200mA) , IR=30uA(VR=10V)		
6	D502	DIODE,TVS	EDTY0007401	SMD ,12 V,350 W,R/TP ,		
6	D600	DIODE,TVS	EDTY0008601	SOD-323 ,6 V,400 W,R/TP ,PB-FREE		
6	FB500	FILTER,BEAD,CHIP	SFBH0001501	120 ohm,1608 ,		
6	FB501	FILTER,BEAD,CHIP	SFBH0001501	120 ohm,1608 ,		
6	FB504	FILTER,BEAD,CHIP	SFBH0008103	1000 ohm,1005 ,chip bead, 200mA,DCR0.9ohm , , , ,SMD ,R/TP		
6	FL100	FILTER,SEPERATOR	SFAY0008602	850,900 ,1800.1900 , dB, dB, dB, dB,4532 ,GSM QUAD FEM FOR RENESAS RFIC		
6	FL101	FILTER,SAW	SFSY0030301	836.5 MHz,1.4*1.1*0.6 ,SMD ,Pb-free_DCN_Tx_SAW		
6	FL300	FILTER,EMI/POWER	SFEY0011601	SMD ,SMD ,18 V,4ch. EMI_ESD Filter (50 Ohm,15pF)		
6	FL301	FILTER,EMI/POWER	SFEY0011601	SMD ,SMD ,18 V,4ch. EMI_ESD Filter (50 Ohm,15pF)		
6	FL302	FILTER,EMI/POWER	SFEY0011601	SMD ,SMD ,18 V,4ch. EMI_ESD Filter (50 Ohm,15pF)		
6	FL303	FILTER,EMI/POWER	SFEY0011601	SMD ,SMD ,18 V,4ch. EMI_ESD Filter (50 Ohm,15pF)		
6	J400	CONN,SOCKET	ENSY0018701	6 PIN,ETC , ,2.54 mm,H=1.8		
6	L100	CAP,CERAMIC,CHIP	ECCH0000107	6 pF,50V,D,NP0,TC,1005,R/TP		

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	L101	INDUCTOR,CHIP	ELCH0004704	4.7 nH,S ,1005 ,R/TP ,		
6	L102	INDUCTOR,CHIP	ELCH0004711	22 nH,J ,1005 ,R/TP ,		
6	L103	INDUCTOR,CHIP	ELCH0004713	6.8 nH,J ,1005 ,R/TP ,		
6	L104	INDUCTOR,CHIP	ELCH0004714	18 nH,J ,1005 ,R/TP ,		
6	L105	INDUCTOR,CHIP	ELCH0004713	6.8 nH,J ,1005 ,R/TP ,		
6	L106	INDUCTOR,CHIP	ELCH0004713	6.8 nH,J ,1005 ,R/TP ,		
6	L107	INDUCTOR,CHIP	ELCH0004701	12 nH,J ,1005 ,R/TP ,		
6	L108	INDUCTOR,CHIP	ELCH0004713	6.8 nH,J ,1005 ,R/TP ,		
6	L112	INDUCTOR,CHIP	ELCH0004710	15 nH,J ,1005 ,R/TP ,		
6	L113	INDUCTOR,CHIP	ELCH0004704	4.7 nH,S ,1005 ,R/TP ,		
6	L197	INDUCTOR,CHIP	ELCH0004722	47 nH,J ,1005 ,R/TP ,		
6	L198	INDUCTOR,CHIP	ELCH0001414	27 nH,J ,1005 ,R/TP ,Pb Free		
6	L199	INDUCTOR,CHIP	ELCH0001414	27 nH,J ,1005 ,R/TP ,Pb Free		
6	L200	INDUCTOR,CHIP	ELCH0005009	100 nH,J ,1005 ,R/TP ,		
6	L500	INDUCTOR,SMD,POWER	ELCP0008001	4.7 uH,M ,2.5*2.0*1.0 ,R/TP ,		
6	L501	INDUCTOR,SMD,POWER	ELCP0008004	4.7 uH,M ,1 ,R/TP , , , , ,0.3NH , , , , ,NON SHIELD ,2.5X2X1MM ,11MM ,R/TP		
6	L502	INDUCTOR,SMD,POWER	ELCP0008001	4.7 uH,M ,2.5*2.0*1.0 ,R/TP ,		
6	L503	INDUCTOR,SMD,POWER	ELCP0008001	4.7 uH,M ,2.5*2.0*1.0 ,R/TP ,		
6	L700	INDUCTOR,SMD,POWER	ELCP0008001	4.7 uH,M ,2.5*2.0*1.0 ,R/TP ,		
6	L701	INDUCTOR,SMD,POWER	ELCP0008001	4.7 uH,M ,2.5*2.0*1.0 ,R/TP ,		
6	MIC500	MICROPHONE	SUMY0010603	PIN ,42 dB,4.72*3.76*1.25 ,MEMS MIC , , , ,OMNI ,1.5TO5V , ,SMD		
6	R100	RES,CHIP,MAKER	ERHZ0000212	12 Kohm,1/16W ,F ,1005 ,R/TP		
6	R101	RES,CHIP,MAKER	ERHZ0000310	680 ohm,1/16W ,F ,1005 ,R/TP		
6	R104	RES,CHIP,MAKER	ERHZ0003801	5.1 ohm,1/16W ,J ,1005 ,R/TP		
6	R107	RES,CHIP	ERHY0013101	2.7 ohm,1/16W ,J ,1005 ,R/TP		
6	R109	RES,CHIP,MAKER	ERHZ0000402	10 ohm,1/16W ,J ,1005 ,R/TP		
6	R111	RES,CHIP,MAKER	ERHZ0000504	68 ohm,1/16W ,J ,1005 ,R/TP		
6	R112	RES,CHIP,MAKER	ERHZ0000201	100 ohm,1/16W ,F ,1005 ,R/TP		
6	R113	RES,CHIP,MAKER	ERHZ0000201	100 ohm,1/16W ,F ,1005 ,R/TP		
6	R114	RES,CHIP,MAKER	ERHZ0000504	68 ohm,1/16W ,J ,1005 ,R/TP		
6	R115	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	R117	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
6	R118	RES,CHIP,MAKER	ERHZ0000201	100 ohm,1/16W ,F ,1005 ,R/TP		
6	R119	RES,CHIP,MAKER	ERHZ0000201	100 ohm,1/16W ,F ,1005 ,R/TP		
6	R120	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R200	RES,CHIP,MAKER	ERHZ0000407	1000 Kohm,1/16W ,J ,1005 ,R/TP		
6	R201	RES,CHIP,MAKER	ERHZ0000222	150 Kohm,1/16W ,F ,1005 ,R/TP		
6	R202	RES,CHIP,MAKER	ERHZ0000222	150 Kohm,1/16W ,F ,1005 ,R/TP		
6	R204	RES,CHIP,MAKER	ERHZ0000493	51 Kohm,1/16W ,J ,1005 ,R/TP		
6	R205	RES,CHIP,MAKER	ERHZ0000493	51 Kohm,1/16W ,J ,1005 ,R/TP		
6	R206	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R207	RES,CHIP,MAKER	ERHZ0000490	51 ohm,1/16W ,J ,1005 ,R/TP		
6	R211	RES,CHIP,MAKER	ERHZ0000437	2 Kohm,1/16W ,J ,1005 ,R/TP		
6	R312	RES,CHIP,MAKER	ERHZ0000463	33 ohm,1/16W ,J ,1005 ,R/TP		
6	R314	RES,CHIP,MAKER	ERHZ0000490	51 ohm,1/16W ,J ,1005 ,R/TP		
6	R315	RES,CHIP,MAKER	ERHZ0000490	51 ohm,1/16W ,J ,1005 ,R/TP		
6	R316	RES,CHIP,MAKER	ERHZ0000490	51 ohm,1/16W ,J ,1005 ,R/TP		
6	R317	RES,CHIP,MAKER	ERHZ0000490	51 ohm,1/16W ,J ,1005 ,R/TP		
6	R319	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		
6	R320	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R321	RES,CHIP,MAKER	ERHZ0000404	1 Kohm,1/16W ,J ,1005 ,R/TP		
6	R322	RES,CHIP,MAKER	ERHZ0000404	1 Kohm,1/16W ,J ,1005 ,R/TP		
6	R329	RES,CHIP,MAKER	ERHZ0000463	33 ohm,1/16W ,J ,1005 ,R/TP		
6	R340	RES,CHIP,MAKER	ERHZ0000267	3300 ohm,1/16W ,F ,1005 ,R/TP		
6	R401	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R402	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R403	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		
6	R504	RES,CHIP,MAKER	ERHZ0003901	0.1 ohm,1/4W ,F ,2012 ,R/TP ; ,0.1 ,1% ,1/4W ,2012 ,R/TP		
6	R506	RES,CHIP,MAKER	ERHZ0004201	121000 ohm,1/16W ,F ,1005 ,R/TP		
6	R507	RES,CHIP,MAKER	ERHZ0000203	10 Kohm,1/16W ,F ,1005 ,R/TP		
6	R509	RES,CHIP,MAKER	ERHZ0000490	51 ohm,1/16W ,J ,1005 ,R/TP		
6	R510	RES,CHIP,MAKER	ERHZ0000404	1 Kohm,1/16W ,J ,1005 ,R/TP		

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	R511	RES,CHIP,MAKER	ERHZ0000431	18 Kohm,1/16W ,J ,1005 ,R/TP		
6	R512	RES,CHIP,MAKER	ERHZ0000493	51 Kohm,1/16W ,J ,1005 ,R/TP		
6	R514	RES,CHIP,MAKER	ERHZ0000486	47 Kohm,1/16W ,J ,1005 ,R/TP		
6	R515	RES,CHIP,MAKER	ERHZ0000493	51 Kohm,1/16W ,J ,1005 ,R/TP		
6	R516	RES,CHIP,MAKER	ERHZ0000404	1 Kohm,1/16W ,J ,1005 ,R/TP		
6	R517	RES,CHIP,MAKER	ERHZ0000431	18 Kohm,1/16W ,J ,1005 ,R/TP		
6	R518	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		
6	R519	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R524	RES,CHIP,MAKER	ERHZ0000504	68 ohm,1/16W ,J ,1005 ,R/TP		
6	R525	RES,CHIP,MAKER	ERHZ0000504	68 ohm,1/16W ,J ,1005 ,R/TP		
6	R603	RES,CHIP,MAKER	ERHZ0000402	10 ohm,1/16W ,J ,1005 ,R/TP		
6	R608	RES,CHIP,MAKER	ERHZ0000402	10 ohm,1/16W ,J ,1005 ,R/TP		
6	R610	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R611	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R612	RES,CHIP,MAKER	ERHZ0000493	51 Kohm,1/16W ,J ,1005 ,R/TP		
6	R613	RES,CHIP,MAKER	ERHZ0000493	51 Kohm,1/16W ,J ,1005 ,R/TP		
6	R614	RES,CHIP,MAKER	ERHZ0000493	51 Kohm,1/16W ,J ,1005 ,R/TP		
6	R615	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R619	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R621	RES,CHIP,MAKER	ERHZ0000288	470 Kohm,1/16W ,F ,1005 ,R/TP		
6	R622	RES,CHIP,MAKER	ERHZ0000318	80.6 Kohm,1/16W ,F ,1005 ,R/TP		
6	R623	RES,CHIP,MAKER	ERHZ0000537	680000 ohm,1/16W ,F ,1005 ,R/TP		
6	R626	RES,CHIP,MAKER	ERHZ0000701	0 ohm,1/10W ,J ,1608 ,R/TP		
6	R726	RES,CHIP,MAKER	ERHZ0000476	39 Kohm,1/16W ,J ,1005 ,R/TP		
6	R728	RES,CHIP	ERHY0000147	56K ohm,1/16W,F,1005,R/TP		
6	R730	RES,CHIP	ERHY0000147	56K ohm,1/16W,F,1005,R/TP		
6	R731	RES,CHIP	ERHY0000147	56K ohm,1/16W,F,1005,R/TP		
6	SW100	CONN,RF SWITCH	ENWY0005301	,SMD , dB,H=1.85 ,; ,3.00MM ,STRAIGHT ,RF ADAPTER ,SMD ,R/TP ,AU , ,		
6	SW600	SWITCH,SLIDE	ESSY0004701	4 V,300 mA,HORIZONTAL , G,Slide Switch ,; ,1C3P ,[empty] ,[empty] ,[empty] ,1.5N , , TP		
6	U100	IC	EUSY0300503	QFN ,56 PIN,R/TP ,RTR6275 EDGE Version RF Transceiver ,; ,IC,CMOS		

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	U101	PAM	SMPY0013501	35 dBm,51 %, A, dBc, dB,7x7x1.1 ,SMD ,Polar Edge		
6	U102	IC	EUSY0278501	SON5-P-0.50 ,5 PIN,R/TP ,INVERTER GATE, Pb Free		
6	U200	IC	EUSY0354401	BGA ,409 PIN,R/TP ,MSM6280 EDGE Baseband ,; ,IC,Digital Baseband Processor		
6	U302	IC	EUSY0330701	FPBGA ,180 PIN,R/TP ,5M Camera,VGA30,Multi audio codec		
6	U402	IC	EUSY0333403	FBGA ,225 PIN,ETC ,2G(LB/128Mx16/2.7V) NAND+1G(8Mx4x32/MONO) SDRAM ,; ,IC,MCP		
6	U500	IC	EUSY0332901	WDFN ,8 PIN,R/TP , -12V, 6.3A, Single P-MOSFET & DUAL Transistor		
6	U501	IC	EUSY0354601	LGA ,84 PIN,R/TP ,PMIC for ESM6270, ,; ,IC,PMIC		
6	U502	IC	EUSY0342001	QFN ,32 PIN,R/TP ,CODEC,3D, 5band equalizer,Stereo HP AMP, Stereo SPKAMP ,; ,IC,Audio Codec		
6	U603	IC	EUSY0140901	SSOP5-P-0.65 ,5 PIN,R/TP ,XOR GATE, Pb Free		
6	U605	IC	EUSY0140901	SSOP5-P-0.65 ,5 PIN,R/TP ,XOR GATE, Pb Free		
6	U606	IC	EUSY0335701	QFN ,8 PIN,R/TP ,1.2W, Mono, Differencial Audio AMP		
6	U701	IC	EUSY0251501	DFN33-12 ,12 PIN,R/TP ,DUALDCDC_DMBpower,400mA,600mA,1Mhz		
6	VA300	VARISTOR	SEVY0004101	5.6 V , ,SMD ,360pF, 1005		
6	VA301	DIODE,TVS	EDTY0009401	VMN2 ,5 V,10 W,R/TP ,1.0*0.6*0.4 ,; , , ,7.82V , , ,100mW ,[empty] ,[empty] ,2P ,1		
6	VA500	VARISTOR	SEVY0007301	5 V,<0.5pF ,SMD ,		
6	VA501	VARISTOR	SEVY0007301	5 V,<0.5pF ,SMD ,		
6	VA502	VARISTOR	SEVY0001001	14 V , ,SMD ,50pF, 1005		
6	VA504	VARISTOR	SEVY0001001	14 V , ,SMD ,50pF, 1005		
6	VA505	VARISTOR	SEVY0001001	14 V , ,SMD ,50pF, 1005		
6	VA506	VARISTOR	SEVY0001001	14 V , ,SMD ,50pF, 1005		
6	VA507	DIODE,TVS	EDTY0008606	DFN-2 ,7.82 V,150 mW,R/TP ,PB-FREE		
6	VA508	DIODE,TVS	EDTY0008606	DFN-2 ,7.82 V,150 mW,R/TP ,PB-FREE		
6	VA601	VARISTOR	SEVY0004301	18 V , ,SMD ,10pF, 1005		
6	VA603	VARISTOR	SEVY0001001	14 V , ,SMD ,50pF, 1005		
6	VA604	VARISTOR	SEVY0001001	14 V , ,SMD ,50pF, 1005		
6	VA605	VARISTOR	SEVY0001001	14 V , ,SMD ,50pF, 1005		
6	X100	VCCTXO	EXSK0007802	19.2 MHz,1.5 PPM,10 pF,SMD ,3.3*2.5*1.0 , ,; ,2.8V , , , ,SMD ,P/TP		
6	X200	RESONATOR	EXRY0002401	48 MHz,5 %,14 pF,SMD ,2.0*1.2*0.65 ,Outgoing Tolerance 0.2%, 0.05% at -40'C ~ +85C, Built-In Cap		

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	X300	X-TAL	EXXY0023301	27 MHz,50 PPM,9 pF,50 ohm,SMD ,3.2*2.5*0.7 ,30ppm at -20°C ~ +70°C, Pb Free		
6	X500	X-TAL	EXXY0018701	32.768 KHz,20 PPM,12.5 pF,70 Kohm,SMD ,3.2*1.5*0.9		
5	SAFD00	PCB ASSY,MAIN,SMT TOP	SAFD0103201			
6	C150	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C151	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C157	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C158	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C166	CAP,CHIP,MAKER	ECZH0000813	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C171	CAP,CHIP,MAKER	ECZH0000841	56 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C172	CAP,CERAMIC,CHIP	ECCH0000117	27 pF,50V,J,NP0,TC,1005,R/TP		
6	C210	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C211	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C212	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C213	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C215	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C216	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C217	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C220	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C221	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C224	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C225	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C226	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C227	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C228	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C229	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C230	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C234	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C302	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C304	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C305	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C306	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	C307	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	C312	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C313	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C314	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C315	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	C316	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C317	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C318	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C319	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C327	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C328	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C329	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C330	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C331	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C332	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C333	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C334	CAP,CERAMIC,CHIP	ECCH0000137	330 pF,50V ,K ,X7R ,HD ,1005 ,R/TP		
6	C335	CAP,CERAMIC,CHIP	ECCH0000137	330 pF,50V ,K ,X7R ,HD ,1005 ,R/TP		
6	C336	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C337	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C338	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C400	CAP,CHIP,MAKER	ECZH0000830	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C401	CAP,CHIP,MAKER	ECZH0000830	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C402	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C412	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C413	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C516	CAP,CERAMIC,CHIP	ECCH0007802	4.7 uF,10V ,M ,X5R ,TC ,1608 ,R/TP		
6	C517	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C520	CAP,CERAMIC,CHIP	ECCH0007802	4.7 uF,10V ,M ,X5R ,TC ,1608 ,R/TP		
6	C521	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C562	CAP,CHIP,MAKER	ECZH0001216	220 nF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C563	CAP,CERAMIC,CHIP	ECCH0005604	10 uF,6.3V ,M ,X5R ,TC ,1608 ,R/TP		

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	C564	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP		
6	C565	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C566	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C567	CAP,CERAMIC,CHIP	ECCH0000179	22 nF,16V ,K ,X5R ,HD ,1005 ,R/TP		
6	C568	CAP,CERAMIC,CHIP	ECCH0000179	22 nF,16V ,K ,X5R ,HD ,1005 ,R/TP		
6	C570	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C571	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C572	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C573	DIODE,TVS	EDTY0008606	DFN-2 ,7.82 V,150 mW,R/TP ,PB-FREE		
6	C574	DIODE,TVS	EDTY0008606	DFN-2 ,7.82 V,150 mW,R/TP ,PB-FREE		
6	C575	CAP,CHIP,MAKER	ECZH0000830	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C576	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	C577	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C578	CAP,CHIP,MAKER	ECZH0001216	220 nF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C579	CAP,TANTAL,CHIP	ECTH0003701	10 uF,6.3V ,M ,L_ ESR ,1608 ,R/TP		
6	C580	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP		
6	C581	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C583	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	C584	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C585	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C588	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	C605	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C606	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C607	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C608	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C609	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C610	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	C611	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	C612	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	C614	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C615	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C616	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	C617	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C618	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C700	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C701	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	D500	DIODE,SWITCHING	EDSY0011901	EMD2 ,30 V,1 A,R/TP ,VF=1.5V(IF=200mA) , IR=30uA(VR=10V)		
6	FB300	FILTER,BEAD,CHIP	SFBH0000903	600 ohm,1005 ,		
6	FB301	FILTER,BEAD,CHIP	SFBH0000903	600 ohm,1005 ,		
6	FB502	FILTER,BEAD,CHIP	SFBH0000903	600 ohm,1005 ,		
6	FB503	FILTER,BEAD,CHIP	SFBH0000903	600 ohm,1005 ,		
6	FL600	FILTER,EMI/POWER	SFEY0011701	SMD ,SMD ,18 V,4ch. EMI_ESD Filter (10 Ohm,7.5pF)		
6	FL601	FILTER,EMI/POWER	SFEY0011701	SMD ,SMD ,18 V,4ch. EMI_ESD Filter (10 Ohm,7.5pF)		
6	L120	INDUCTOR,CHIP	ELCH0004722	47 nH,J ,1005 ,R/TP ,		
6	L127	INDUCTOR,CHIP	ELCH0009114	100 nH,J ,1005 ,R/TP ,coil		
6	L300	INDUCTOR,CHIP	ELCH0010401	2.2 uH,M ,1005 ,R/TP ,		
6	L504	INDUCTOR,CHIP	ELCH0010401	2.2 uH,M ,1005 ,R/TP ,		
6	LD700	DIODE,LED,CHIP	EDLH0011901	WHITE ,1608 ,R/TP ,PB-FREE(ZENER)		
6	LD701	DIODE,LED,CHIP	EDLH0007901	RED ,1608 ,R/TP ,Indicator,0.4T Red LED		
6	LD702	DIODE,LED,CHIP	EDLH0014501	GREEN ,1608 ,R/TP , ; , [empty] ,2.85~3.25 , , , , [empty] ,[empty] ,2P		
6	LD703	DIODE,LED,CHIP	EDLH0007901	RED ,1608 ,R/TP ,Indicator,0.4T Red LED		
6	LD704	DIODE,LED,CHIP	EDLH0011901	WHITE ,1608 ,R/TP ,PB-FREE(ZENER)		
6	LD705	DIODE,LED,CHIP	EDLH0014501	GREEN ,1608 ,R/TP , ; , [empty] ,2.85~3.25 , , , , [empty] ,[empty] ,2P		
6	R121	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		
6	R122	RES,CHIP,MAKER	ERHZ0000204	100 Kohm,1/16W ,F ,1005 ,R/TP		
6	R208	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R217	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
6	R218	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
6	R310	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		
6	R331	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R336	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R338	RES,CHIP,MAKER	ERHZ0000509	75 ohm,1/16W ,J ,1005 ,R/TP		

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	R339	RES,CHIP	ERHY0000170	390 ohm,1/16W ,F ,1005 ,R/TP		
6	R345	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R400	RES,CHIP,MAKER	ERHZ0000422	15 Kohm,1/16W ,J ,1005 ,R/TP		
6	R505	RES,CHIP,MAKER	ERHZ0000487	470 Kohm,1/16W ,J ,1005 ,R/TP		
6	R522	RES,CHIP,MAKER	ERHZ0000422	15 Kohm,1/16W ,J ,1005 ,R/TP		
6	R528	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R529	RES,CHIP,MAKER	ERHZ0000422	15 Kohm,1/16W ,J ,1005 ,R/TP		
6	R530	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
6	R601	RES,CHIP,MAKER	ERHZ0000402	10 ohm,1/16W ,J ,1005 ,R/TP		
6	R602	RES,CHIP,MAKER	ERHZ0000402	10 ohm,1/16W ,J ,1005 ,R/TP		
6	R604	RES,CHIP,MAKER	ERHZ0000402	10 ohm,1/16W ,J ,1005 ,R/TP		
6	R607	RES,CHIP,MAKER	ERHZ0000463	33 ohm,1/16W ,J ,1005 ,R/TP		
6	R701	RES,CHIP,MAKER	ERHZ0000493	51 Kohm,1/16W ,J ,1005 ,R/TP		
6	R703	RES,CHIP	ERHY0003601	2700 ohm,1/16W ,J ,1005 ,R/TP		
6	R704	RES,CHIP	ERHY0003601	2700 ohm,1/16W ,J ,1005 ,R/TP		
6	R705	RES,CHIP,MAKER	ERHZ0000493	51 Kohm,1/16W ,J ,1005 ,R/TP		
6	R706	RES,CHIP,MAKER	ERHZ0000493	51 Kohm,1/16W ,J ,1005 ,R/TP		
6	R707	RES,CHIP,MAKER	ERHZ0000484	470 ohm,1/16W ,J ,1005 ,R/TP		
6	R708	RES,CHIP,MAKER	ERHZ0000484	470 ohm,1/16W ,J ,1005 ,R/TP		
6	R709	RES,CHIP,MAKER	ERHZ0000484	470 ohm,1/16W ,J ,1005 ,R/TP		
6	R710	RES,CHIP,MAKER	ERHZ0000484	470 ohm,1/16W ,J ,1005 ,R/TP		
6	R711	RES,CHIP,MAKER	ERHZ0000483	47 ohm,1/16W ,J ,1005 ,R/TP		
6	R712	RES,CHIP,MAKER	ERHZ0000527	200 ohm,1/6W ,J ,1005 ,R/TP		
6	R713	RES,CHIP,MAKER	ERHZ0000483	47 ohm,1/16W ,J ,1005 ,R/TP		
6	R714	RES,CHIP,MAKER	ERHZ0000527	200 ohm,1/6W ,J ,1005 ,R/TP		
6	R715	RES,CHIP,MAKER	ERHZ0000483	47 ohm,1/16W ,J ,1005 ,R/TP		
6	R716	RES,CHIP,MAKER	ERHZ0000483	47 ohm,1/16W ,J ,1005 ,R/TP		
6	SPFY00	PCB,MAIN	SPFY0169101	FR-4 ,0.8 mm,STAGGERED-10 ,KE990 MAIN ; , , , , , , , , , , , ,		
6	U103	IC	EUSY0335301	WLCSP(Coated) ,25 PIN,R/TP ,FM Tuner(RDS), 3.35*3.3, Pb Free		
6	U300	IC	EUSY0290701	HVSOF5 ,5 PIN,R/TP ,150mA, 2.8V, Auto Power Save LDO		

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	U301	IC	EUSY0336502	, PIN,R/TP , , , IC,Charge Pump		
6	U303	IC	EUSY0346001	SON1612 ,6 PIN,R/TP ,1.9V 150mA Single LDO , , IC,LDO Voltage Regulator		
6	U304	IC	EUSY0338301	uMLP ,10 PIN,R/TP ,High Speed USB Siwitch 2.0 3.7pF 6.5ohm 1.4X1.8		
6	U400	IC	EUSY0317101	WQFN ,10 PIN,R/TP ,1.8*1.4*0.75		
6	U401	IC	EUSY0271201	TQFN ,16 PIN,R/TP ,Quad Analog switch, Pb Free		
6	U503	IC	EUSY0333001	SON1612 ,6 PIN,R/TP ,3.3V, 150mA LDO Pb-Free, Active High		
6	U504	IC	EUSY0303901	QFN,130mW Capless Stereo Headphone Driver ,16 PIN,R/TP ,Capless hp amp		
6	U505	IC	EUSY0333701	TLLGA ,8 PIN,R/TP ,OVP		
6	U506	IC	EUSY0175301	MICROPAK ,6 PIN,R/TP ,SPDT ANALOG SWITCH / 2:1 MUX/DEMUX, Pb Free		
6	U507	IC	EUSY0338301	uMLP ,10 PIN,R/TP ,High Speed USB Siwitch 2.0 3.7pF 6.5ohm 1.4X1.8		
6	U601	IC	EUSY0338701	SON1612-6 ,6 PIN,R/TP ,2.7V 150mA LDO Pb-Free		
6	U602	IC	EUSY0338701	SON1612-6 ,6 PIN,R/TP ,2.7V 150mA LDO Pb-Free		
6	U700	IC	EUSY0337101	CSP ,12 PIN,R/TP ,Touchscreen Controller IC , , IC,A/D Converter		
6	U702	IC	EUSY0333701	TLLGA ,8 PIN,R/TP ,OVP		
6	VA503	VARISTOR	SEVY0001001	14 V ,SMD ,50pF, 1005		
6	VA600	VARISTOR	SEVY0004301	18 V ,SMD ,10pF, 1005		
6	VA602	VARISTOR	SEVY0003801	18 V ,SMD ,		
6	VA700	VARISTOR	SEVY0000702	14 V,10% ,SMD ,		
6	VA701	VARISTOR	SEVY0001001	14 V ,SMD ,50pF, 1005		
6	VA702	VARISTOR	SEVY0001001	14 V ,SMD ,50pF, 1005		
6	VA703	VARISTOR	SEVY0001001	14 V ,SMD ,50pF, 1005		
6	VA704	VARISTOR	SEVY0001001	14 V ,SMD ,50pF, 1005		
6	VA705	VARISTOR	SEVY0001001	14 V ,SMD ,50pF, 1005		
6	VA706	VARISTOR	SEVY0001001	14 V ,SMD ,50pF, 1005		
6	VA707	VARISTOR	SEVY0001001	14 V ,SMD ,50pF, 1005		
6	VA708	VARISTOR	SEVY0000702	14 V,10% ,SMD ,		
6	VA709	VARISTOR	SEVY0001001	14 V ,SMD ,50pF, 1005		
6	VA710	VARISTOR	SEVY0001001	14 V ,SMD ,50pF, 1005		
6	VA711	VARISTOR	SEVY0001001	14 V ,SMD ,50pF, 1005		

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	VA712	VARISTOR	SEVY0001001	14 V ,SMD ,50pF, 1005		
3	SAJY00	PCB ASSY,SUB	SAJY0030401			
4	SAJB00	PCB ASSY,SUB,INSERT	SAJB0012004			
5	SMZY00	MODULE,ETC	SMZY0016803	STROBE LAMP ,; ,Strobe Lamp		
5	SUSY00	SPEAKER	SUSY0026002	UNIT ,8 ohm,83 dB,16 mm,19.85*18.75*6.1 Module SPK ; , , , , , , ,[empty]		
4	SAJE00	PCB ASSY,SUB,SMT	SAJE0024101			
5	SAJC00	PCB ASSY,SUB,SMT BOTTOM	SAJC0023001			
6	C348	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C349	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	C901	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C902	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C903	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C904	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C905	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C906	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	C907	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	C908	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C909	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	MIC900	MICROPHONE	SUMY0010507	UNIT ,42 dB,4*1.35 ,SMD		
6	R318	RES,CHIP,MAKER	ERHZ0000204	100 Kohm,1/16W ,F ,1005 ,R/TP		
6	R800	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R904	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R905	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		
6	R906	RES,CHIP,MAKER	ERHZ0000407	1000 Kohm,1/16W ,J ,1005 ,R/TP		
6	R907	RES,CHIP,MAKER	ERHZ0000530	5.1 Kohm,1/16W ,J ,1005 ,R/TP		
6	R908	RES,CHIP,MAKER	ERHZ0000204	100 Kohm,1/16W ,F ,1005 ,R/TP		
6	R909	RES,CHIP,MAKER	ERHZ0000204	100 Kohm,1/16W ,F ,1005 ,R/TP		
6	S800	CONN,SOCKET	ENSY0015801	8 PIN,ETC , , 1.1 mm,H=1.9, Detect Pin		
6	U800	IC	EUSY0129503	2x2 mm MLPD ,3 PIN,R/TP ,Hall Effect Switch, Pb Free		
6	U900	IC	EUSY0294701	SON1612-6 ,6 PIN,R/TP ,1.8V 150mA LDO Pb-Free		
6	U901	IC	EUSY0338701	SON1612-6 ,6 PIN,R/TP ,2.7V 150mA LDO Pb-Free		

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	U902	IC	EUSY0250501	SC70 ,5 PIN,R/TP ,Comparator, pin compatible to EUSY0077701		
6	U903	IC	EUSY0129503	2x2 mm MLPD ,3 PIN,R/TP ,Hall Effect Switch, Pb Free		
6	U904	IC	EUSY0129503	2x2 mm MLPD ,3 PIN,R/TP ,Hall Effect Switch, Pb Free		
6	ZD900	DIODE,TVS	EDTY0008610	SOD-523 ,5 V,250 W,R/TP ,PB-FREE		
5	SAJD00	PCB ASSY,SUB,SMT TOP	SAJD0025601			
6	BAT900	BATTERY,CELL,LITHIUM	SBCL0001701	2 V,0.5 mAh,CYLINDER ,Reflow type BB, Max T 1.67, phi 4.8, Pb-Free		
6	C801	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C802	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C803	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C804	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C805	CAP,CHIP,MAKER	ECZH0000830	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C806	CAP,CHIP,MAKER	ECZH0000830	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C807	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C808	CAP,CHIP,MAKER	ECZH0000830	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C809	CAP,CHIP,MAKER	ECZH0000830	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C810	CAP,CHIP,MAKER	ECZH0000830	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C811	CAP,CHIP,MAKER	ECZH0000813	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C812	CAP,CHIP,MAKER	ECZH0003103	0.1 uF,10V ,K ,X7R ,HD ,1005 ,R/TP		
6	C813	CAP,CHIP,MAKER	ECZH0000813	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C814	CAP,CHIP,MAKER	ECZH0001421	2.2 uF,6.3V ,K ,X5R ,HD ,1608 ,R/TP		
6	C900	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	CN801	CONNECTOR,BOARD TO BOARD	ENBY0029401	40 PIN,0.4 mm,ETC , ,H=3.0		
6	M800	MODULE,ETC	SMZY0012601	4.5x3.2x1.2 Bluetooth RF Module		
6	R801	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R802	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R803	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R804	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R805	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R806	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R808	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	R809	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		
6	R810	CAP,CHIP,MAKER	ECZH0000830	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	R811	CAP,CHIP,MAKER	ECZH0000830	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
5	SPJY	PCB,SUB	SPJY0051001	FR-4 ,0.5 mm,BUILD-UP 4 ,KU995 SUB ,; , , , , , , , , , ,		
3	SMZY00	MODULE,ETC	SMZY0017701	1GB / MICROSD / SSE MLC 1 DIE ,; ,Module Assembly		
		MODULE,ETC	SMZY0017801	1GB / MICROSD / MLC 1 DIE ,; ,Module Assembly		
		MODULE,ETC	SMZY0018301	1GB / MICROSD / HYN MLC 1 DIE / EAN30221132 ,; ,Module Assembly		

11. EXPLODED VIEW & REPLACEMENT PART LIST

11.3 Accessory

Note: This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	Part Number	Spec	Color	Remark
3	SBPL00	BATTERY PACK,LI-ION	SBPL0091106	3.7 V,1000 mAh,1 CELL,PRISMATIC ,553446, Latin America Label ,; , , ,PRISMATIC , , ,BLACK , ,	Black	
		BATTERY PACK,LI-ION	SBPL0093706	3.7 V,1000 mAh,1 CELL,PRISMATIC ,553446 Latin America Label ,; , , ,PRISMATIC , , ,BLACK , ,	Black	
3	SGDY00	DATA CABLE	SGDY0010908	; ,[empty] ,[empty] ,[empty] ,18pin 6.2mm. NYX Box Package ,BLACK , ,N		
3	SGEY00	EAR PHONE/EAR MIKE SET	SGEY0005546	; ,10mW ,16ohm ,111dB ,20HZ ,20HZ ,[empty] ,BLACK ,18P MMI CONNECTOR ,Plug Mold(Abnormal) ,Earphone,Stereo		
3	SSAD00	ADAPTOR,AC-DC	SSAD0024604	100-240V ,5060 Hz,5.1 V,0.7 A,NOM ,18pin MMI, Nyx packing, Mexico ,; , , , , ,WALL 2P ,I/O CONNECTOR ,		

Note
